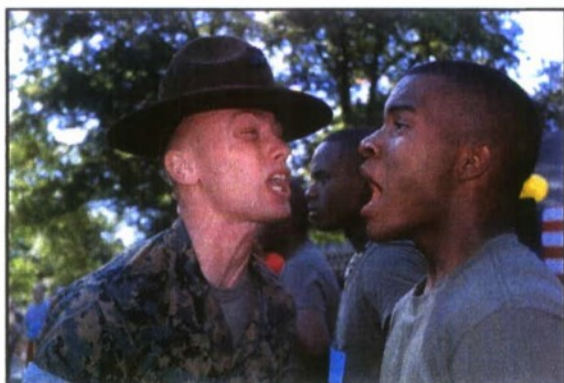


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# Marine Corps Recruits: A Historical Look at Accessions and Bootcamp Performance

Aline O. Quester



CAB D0023537.A1/Final  
September 2010

20101025514

Photo credit line: SSgt. Ken Tinnin (Photo on the left)

1<sup>st</sup> Marine Corps District

Drill Instructor Sgt Robert Donathan, 1<sup>st</sup> Recruit Training Battalion, Marine Corps Recruit Depot Parris Island, SC, encourages a Marine Corps Recruiting Station Portsmouth, N.H. poolee to sound-off at RS Portsmouth's annual mini bootcamp Sept. 24-25 at the Blue Hills Reservation in Milton, MA.

Photo credit line: SSgt. J.L. Wright Jr. (Photo on the right)

1<sup>st</sup> Marine Corps District

Sgt Paul Nixon, drill instructor, 3<sup>rd</sup> Recruit Training Battalion, Marine Corps Recruit Depot, Parris Island, SC, gives a poolee some added incentive to do what he's told. Approximately 400 future Marines gathered May 7, 2005 at Fort Indian Town Gap, PA for Recruiting Station Harrisburg's Annual Future Marine Challenge. The purpose of the event is to familiarize the future Marines with bootcamp and to allow them to learn about teamwork and camaraderie.

Approved for distribution:

September 2010



Anita Hattiangadi  
Marine Corps Manpower Team  
Resource Analysis Division

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## Accessions over the years

- CNA database for non-prior-service (NPS) accessions
  - FY79 to FY09
  - We collect accession characteristics and follow for first 73 months of service
  - User selects number of months, characteristics, and accession FYs
- Characteristics correlated with low attrition
  - Gender
  - Contract length
  - Education
  - Armed Forces Qualification Test (AFQT) score
  - Enlistment waivers
  - Bootcamp attended
  - Race/ethnicity
  - Delayed Entry Program (DEP) status
  - Season of entry
  - Meets retention weight-for-height standard
  - Recruited as a high school senior

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CNA has maintained personnel databases for the Marine Corps for more than 30 years. Our individual Marine Corps accession records go back to the FY79 recruit cohort. Thus, they include various Marine Corps official data records: Grandram, ARMS, and MCRISS.

For as long as we have been keeping the official records, we have been analyzing recruit characteristics and attrition through studies and scientific analyst memoranda. Over the years, we have identified characteristics that are particularly important to monitor because they are closely associated with successful adaptation to life in the Marine Corps (see slide).

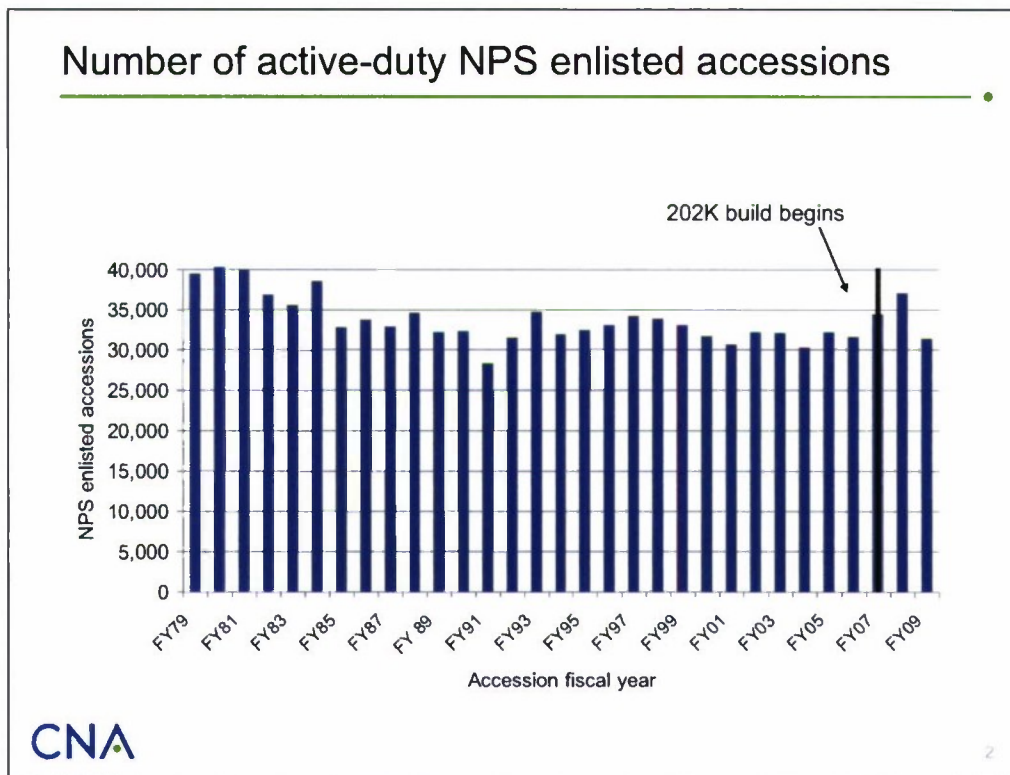
In this annotated briefing, we will review the last 30 years, trying to answer the following questions:

- Have recruit characteristics changed over time?
- Have the relationships between recruit characteristics and subsequent attrition remained stable, or have the patterns changed?
- What characteristics are most important for predicting success in the Corps?

We will examine a particular recruit characteristic and then will discuss how that particular characteristic is related to an unsuccessful job match (bootcamp attrition).<sup>1</sup> At some points, however, we will look at attrition over the entire first term of service.

---

<sup>1</sup>The Marine Corps calls its bootcamps Marine Corps Recruit Depots (MCRDs).



Congress sets Marine Corps endstrength each year, and Marine Corps accessions are the lever the Marine Corps uses to attain that endstrength. If endstrength is constant from year to year, the Marine Corps is accessing only to replace losses. About two-thirds of these losses occur at the end of active service (EAS losses) and about one-third occurs during the contractual period (non-EAS losses).

For most of the past 30 years, the Marine Corps has accessed between 30,000 and 40,000 non-prior-service (NPS) enlisted recruits annually.<sup>2</sup> The number of required accessions depends on both changes in endstrength levels and losses. Among other things, losses depend on the state of the economy, military and civilian compensation levels, and the mix of first-term contract lengths.

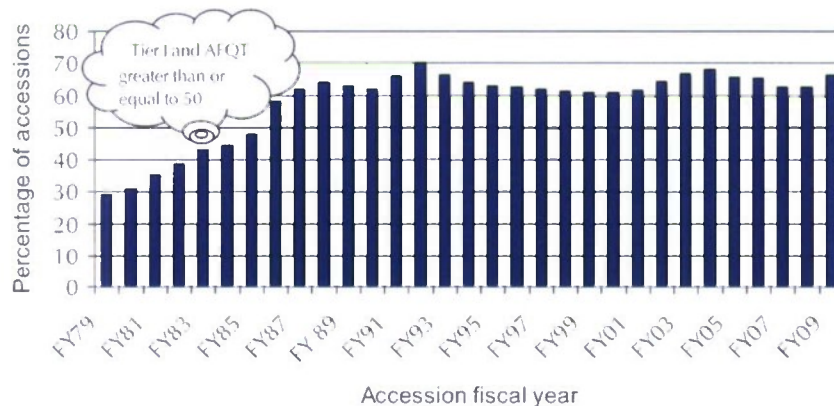
The enlisted Marine Corps is largely a first-term force, and first-term EAS losses have averaged between 40 and 56 percent of all losses in the last decade.<sup>3</sup> From FY79 to FY84, accessions were higher because the Corps needed to replace large numbers of 3-year obligors. In the mid-1980s through about FY91, accessions fell as 3-year obligations disappeared and more 5- and 6-year obligors were accessed. Accessions rose a bit in the mid- and late-1990s when the accession program for 6-year obligors was discontinued. In all periods, 4-year obligors made up the majority of contracts.

Accessions fall in the war years, primarily because of the sharp drop in all types of attrition. When the build to a 202K active-duty force began in mid-FY07, accessions rose fairly sharply. For FY10, however, accessions have been reduced as the Corps tries to keep endstrength from exceeding 202K.

<sup>2</sup>All accession data in this briefing are for NPS accessions.

<sup>3</sup>In FY08, first-term EAS losses were 51.1 percent of all losses; in FY09, they were 53.1 percent.

## Enlisted accessions: High-quality percentage



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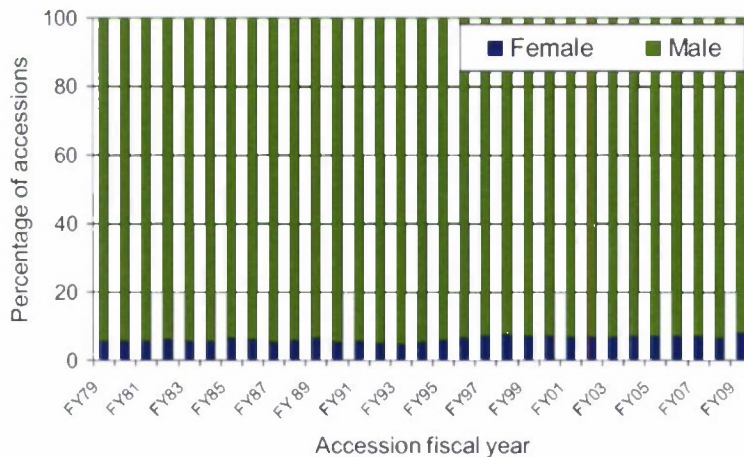
High-quality recruits are defined as those who both test in the top half (above the 50<sup>th</sup> percentile) on a nationally normed ability test, the AFQT, and whose educational backgrounds classify them in the top educational category, Tier I (primarily high school diploma graduates).

Commandants Wilson (1975 to 1979) and Barrow (1979 to 1983) both emphasized the importance of recruit quality. Their influence is seen in the figure; the proportion of high-quality recruits practically doubled between FY79 and FY87. In fact, in every year since FY87, at least 60 percent of Marine Corps NPS accessions have been high quality.

DoD has established the following benchmarks for both AFQT distribution and Tier I: 60 percent of recruits must test in the top half of the AFQT, and 90 percent of recruits must be Tier I. The Marine Corps has exceeded these benchmarks since the early 1990s, with about 95 percent of recruits having Tier I educational backgrounds and 65 percent having test scores in the top half of the ability distribution. Even in the early years of Operations Iraqi Freedom (OIF) and Enduring Freedom (OEF), when the unemployment rate was low and civilian opportunities were abundant for young men and women, the Marine Corps maintained its high-quality standards.



## Percentage of enlisted accessions by gender



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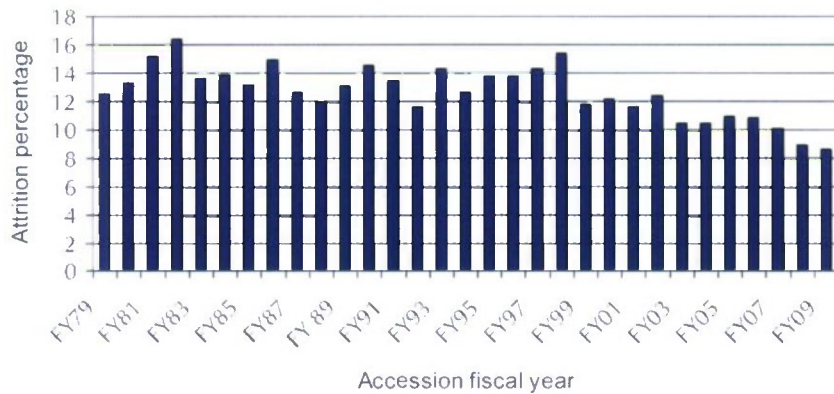
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The Marine Corps is primarily a male organization. By law, women cannot be assigned to ground combat occupations; this means that occupational specialties such as infantry, armor, field artillery, and short-range air defense artillery are closed to women. Furthermore, women are restricted from serving in specific billets that are included in infantry battalions, such as those in administration and logistics.

This slide shows the percentage of male and female accessions by FY. Women represented between 4 and 6 percent of enlisted accessions from FY79 to FY93, when the percentage dropped to 4.6 percent. The percentage began to climb in FY93, reaching 7.4 percent in FY98. It has stayed about 7 percent for the last decade, rising to 8.2 percent in FY09.<sup>4</sup>

<sup>4</sup>To avoid exceeding endstrength limits, accessions were cut in FY09. Some of these cuts were made late in the FY. Since proportionally fewer women than men enter in the summer months, female accessions were not cut as sharply as male accessions.

## Bootcamp attrition rate



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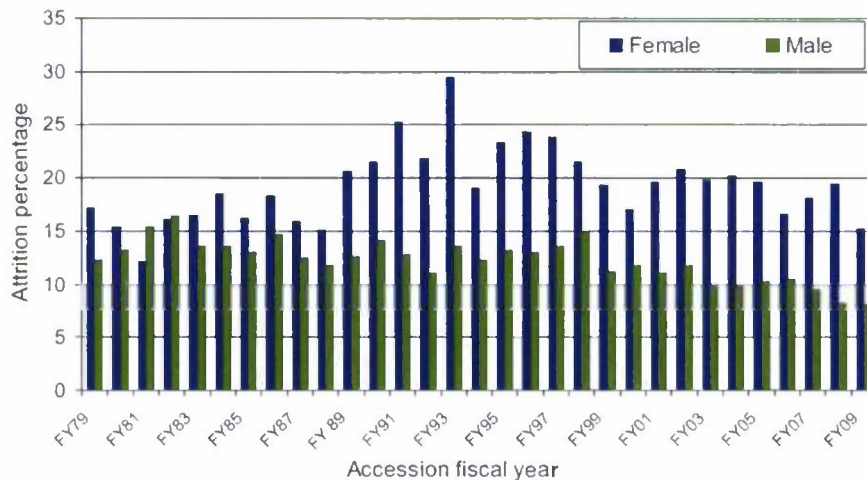
The Marine Corps operates two bootcamps, or Marine Corps Recruit Depots (MCRDs). MCRD Parris Island trains all the female recruits and about half of the male recruits. MCRD San Diego trains the other half of male recruits. Although there have been slight variations over time, bootcamp length since FY72 usually has been about 12 weeks. Some recruits will take longer than 12 weeks because they need extra work (improving their physical fitness, reducing their weight, healing from injuries, etc.).

In spite of some spikes, one can see general trends in bootcamp attrition. It rose from FY79 through FY82, generally fell until FY88, bounced around until FY95, and rose from FY95 through FY98. It fell sharply in FY99 and has continued to be very low throughout OEF and OIF. FY09 bootcamp attrition will probably rise a fraction of a point over what is pictured in the slide above.<sup>5</sup>

<sup>5</sup>The data for this report are current through December 2009. In December 2009, there were still a small number of recruits who had accessed in FY09 but were still at the bootcamps. Some of these will still attrite. This should be kept in mind for all briefing figures that report FY09 bootcamp attrition.



## Male and female bootcamp attrition rates



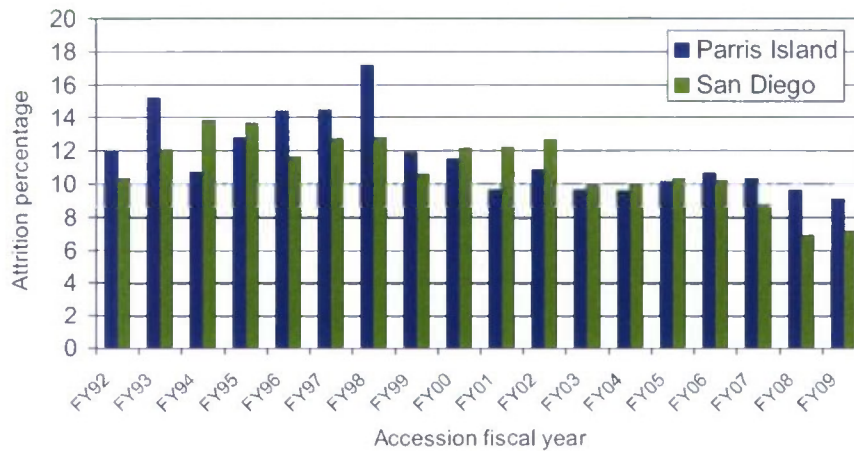
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In this slide, we contrast male and female bootcamp attrition. In the early years of our data (through about FY82), male and female training at the depot was very different. Women were not expected to shoot rifles or train hard physically; indeed, there were even classes in makeup application for female recruits. In about FY83, training began to become more similar. Gender similarity in training culminated in FY95/FY96 when the Crucible was initiated and male and female training became virtually identical. Male and female recruits, however, train in separate battalions at Parris Island.

As training has become more similar for male and female recruits, female attrition rose and—in many years—female bootcamp attrition was about double that of males. Being a female Marine in the 1970s was quite a different job than being a female Marine in recent years. Although it has always been a nontraditional job for females, it has become more so, at least in terms of training and occupation, over the years. Moreover, not only are many of the jobs that female Marines perform nontraditional, the setting is extremely nontraditional, considering the fact that the Marine Corps is about 94 percent male.

## Male bootcamp attrition rate by MCRD attended



FY09 attrition is only for the first 3 months. It can be expected to rise somewhat because some FY09 accessions are still in bootcamp.

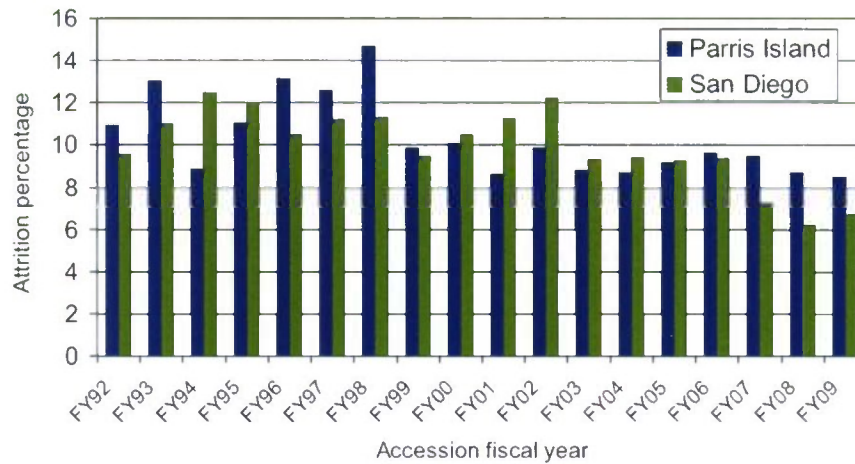
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In this slide, we examine male bootcamp attrition rates by MCRD attended. In any particular accession year, male recruit quality should be virtually identical at the two depots. Attrition, then, should be roughly similar, although there is a general feeling among Marines that attrition will be higher at Parris Island because of the weather. Bad weather causes training events to be postponed and also may increase the feeling that "this is not for me." Weather in San Diego is fairly constant and pleasant over the seasons in the year, whereas Parris Island contends with cold rain and hot and buggy weather. Still, as the figure shows, there were years in which the male bootcamp attrition rate was higher at San Diego than at Parris Island.

Since FY06, but particularly in FY08 and FY09, male bootcamp attrition was definitely higher at MCRD Parris Island. Next, we examine male attrition rates at the two depots and restrict the comparison to high-quality recruits.

Male bootcamp attrition rates by MCRD attended:  
High-quality recruits only



High-quality recruits are Tier I and have AFQT scores greater than or equal to the 50<sup>th</sup> percentile.

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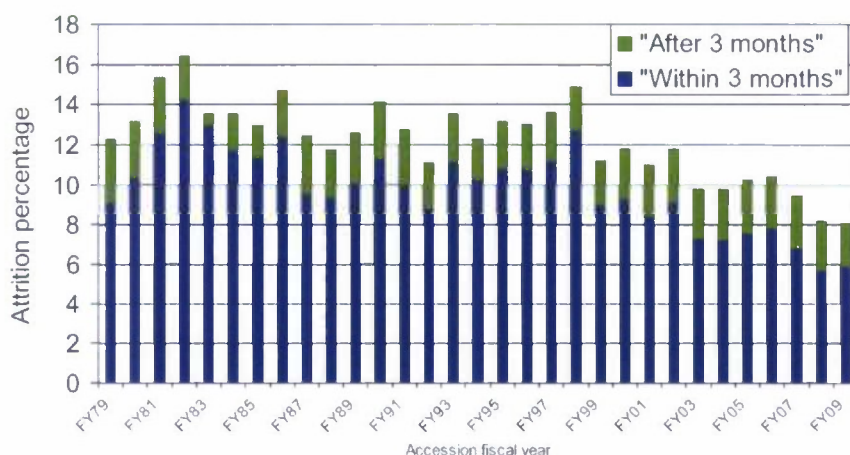
8

Restricting the comparison to attrition rate differences for male high-quality recruits does not narrow the differences between attrition rates at the two depots. The differences, however, are not all in the same direction. In some years, attrition rates are higher at Parris Island; in other years, they are higher at San Diego.

Appendix A contains multivariate analyses of attrition, both in bootcamp and in the first term. In these logistic regressions, we hold constant the effects of all variables except the one of interest. For male bootcamp attrition, other things equal, the rates at MCRD Parris Island averaged 0.4 percentage point lower than the rates at MCRD San Diego in the FY99–FY09 period. For male first-term attrition, the rates at Parris Island averaged 0.6 percentage point higher. In short, if there are systematic differences by depot attended, the systematic differences in attrition are very small. Within a particular year, however, the differences can be quite large.



## Male bootcamp attrition timing



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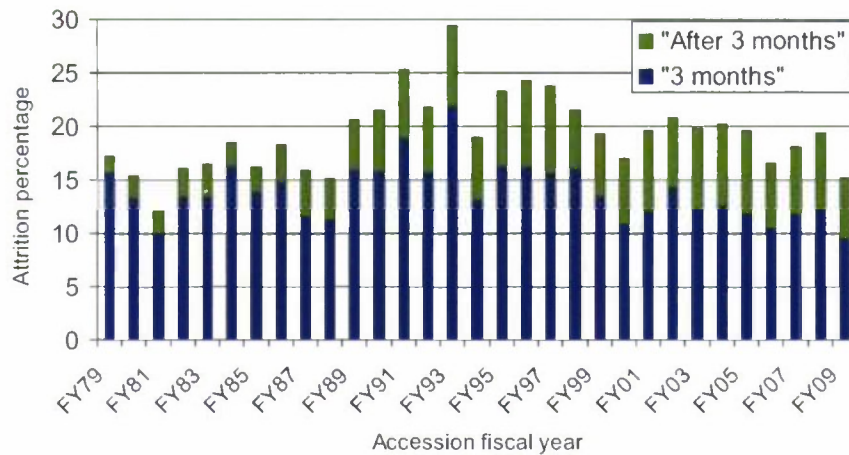
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Next, we examine the timing of attrition during recruit training. Because we do not have information on the day the attrition occurred, we can only roughly divide attrition into early and late attrition using year/month to calculate attrition timing. Thus, attrition “after 3 months” could be attrition as early as a little over 2 months or as late as almost 4 months.<sup>6</sup>

Between 2 and 3 percentage points of the male attrition occurs late. This seems to be true both in the years that attrition was 14 percent and, in recent years, when attrition has been about 8 percent.

<sup>6</sup>For example, if a recruit enters in late July and attrites in early October, the recruit has been in the Corps only a little over 2 months, but we would calculate 3 months (July to October). Alternatively, if a recruit entered early in July and left late in October, we also would calculate 3 months, but the recruit would actually have been there almost 4 months.

## Female bootcamp attrition timing

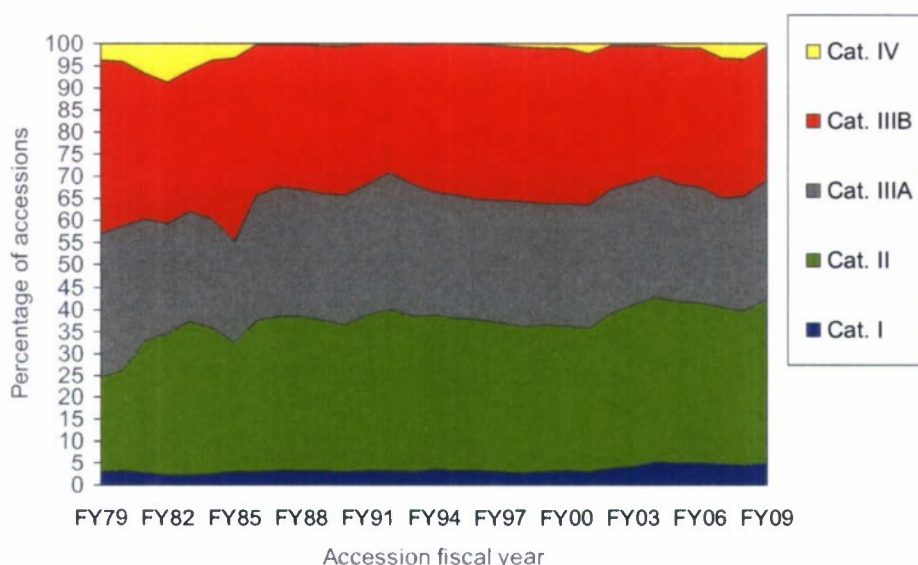


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The timing of female bootcamp attrition is different from that of male attrition, particularly since the early 1990s. While currently about a quarter of male attrition occurs late, almost 40 percent of female attrition occurs late in training.

## Percentage of accessions by AFQT categories



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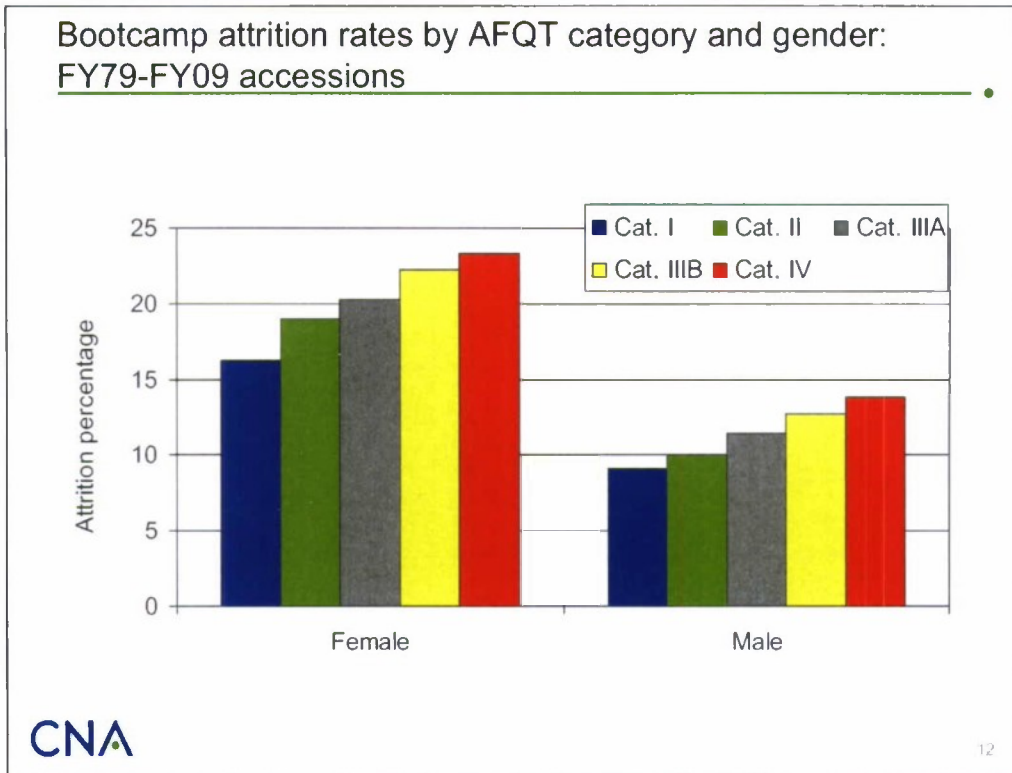
In this slide, we examine the distribution of AFQT categories for accessions over the last 30 years. AFQT is a nationally normed ability test with each category (Cat.) corresponding to percentiles in the population. Specifically:

- Cat. I: 93<sup>rd</sup> to 99<sup>th</sup> percentile
- Cat. II: 65<sup>th</sup> to 92<sup>nd</sup> percentile
- Cat. IIIA: 50<sup>th</sup> to 64<sup>th</sup> percentile
- Cat. IIIB: 31<sup>st</sup> to 49<sup>th</sup> percentiles
- Cat. IV: below 30<sup>th</sup> percentile.<sup>7</sup>

Over the last 30 years, AFQT scores have increased for Marine Corps accessions. Although the percentage of Cat. I recruits averaged 3.4 percent over the period, it reached 5.0 percent for FY09 accessions. Similarly, Cat. II recruits averaged 33.5 percent over the 30-year period, but hit 37.2 percent for FY09 accessions. We discuss Cat. IV recruits in more detail later in the briefing.

<sup>7</sup>By law, recruits who score below the 10<sup>th</sup> percentile are not allowed to access.

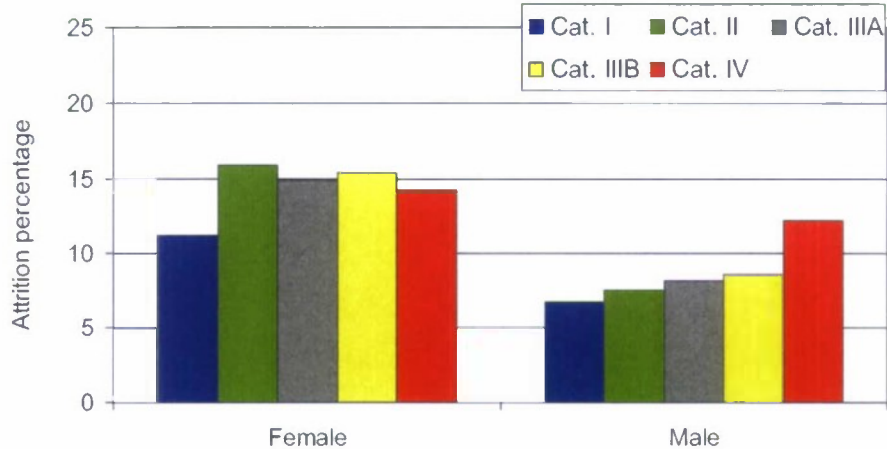




In this slide, we show average bootcamp attrition rates by AFQT category for the past 30 years. Since male and female bootcamp attrition rates have been so different, we show separate rates for each gender.

Those who test higher on the AFQT have, on average, lower attrition rates. The pattern is consistent over time. At least as important as lower attrition rates, however, is the ability of higher scoring recruits to meet more occupational qualifications. In addition, higher scoring recruits have shown better performance. The most rigorous testing of this was done in the Job Performance Tests almost 30 years ago when the Marine Corps tested actual job performance. In addition, those with lower scores are restricted to a smaller set of military occupational specialties (MOSs).

### Bootcamp attrition rates by AFQT category and gender: FY09 accessions



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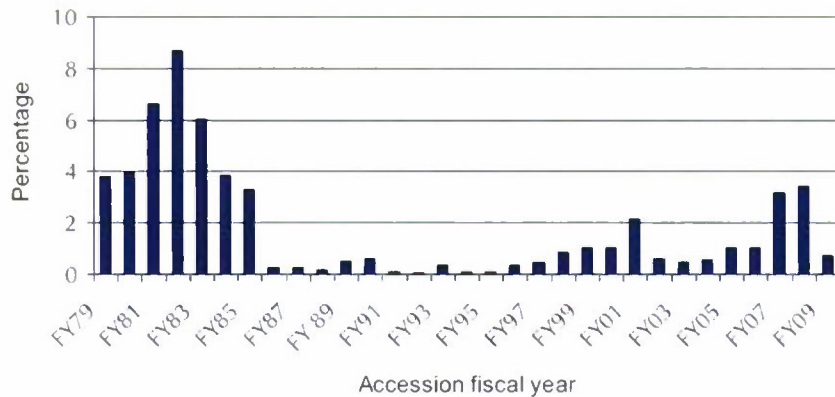
13

Whereas the previous slide showed average bootcamp attrition rates by AFQT category and gender for the past 30 years, the figure above shows bootcamp attrition rates for FY09 accessions only. Here the picture is a bit more mixed.

Attrition rates were considerably lower for FY09 accessions than the 30-year average. In particular, FY09 male Cat. IV attrition (which looks very high in the above graph) is below the average attrition levels for Cat. IIIBs for the past 30 years. And, female bootcamp attrition rates do not seem to vary systematically by AFQT category except for the highest testing recruits in Cat. I.

Although the rules have changed over time, in some earlier years, female recruits needed AFQT scores above the 50<sup>th</sup> percentile to enlist. In fact, until recent years, average female recruit AFQT scores exceeded those of male recruits. This is no longer true. In FY09, 5.0 percent of male recruits were AFQT Cat. I (3.9 percent of female recruits), and 37.6 percent of male recruits were Cat. II (33.4 percent of female recruits).

## Percentage of Cat. IV accessions



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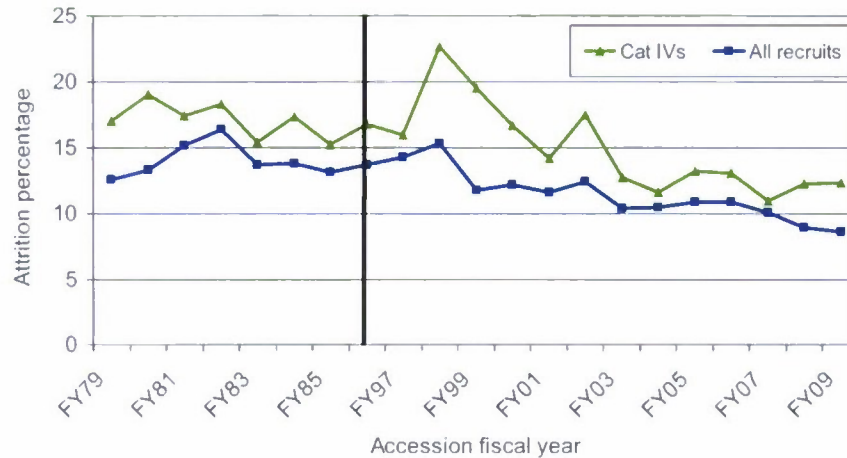
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Despite the small number of Cat. IV accessions, there has been considerable interest in both the proportions accessed and in their subsequent performance. Here we show the proportion accessed each year since FY79. Commandant Conway released the Marine Corps' 2-percent cap on Cat. IV accessions for FY07 and FY08 when the Marine Corps was growing rapidly. This was the only quality measure that was relaxed during the 202K build, and was done so in an effort to ease pressure on recruiters. In FY09, the cap was reintroduced and, as is clear from the figure above, Cat. IV recruits represented less than 1 percent of accessions.

Although we do not show more detailed analysis of Cat. IV recruits here, it is important to note that Marine Corps policy requires that Cat. IV accessions be Tier I recruits and have no waivers above the level that can be approved by a recruiting station commander. Furthermore, previous CNA work has found that some Cat. IV accessions perform comparably to Cat. IIIB accessions. (See, for example, Dana Brookshire and Anita Hattiangadi, *Emerging Issues in USMC Recruiting: Assessing the Success of Cat. IV Recruits in the Marine Corps*, CAB D0014741.A1/Final, August 2006). Finally, no recruit characteristic appears in isolation—recruiters must consider the package of characteristics a potential recruit embodies and must assess his/her chances for success. Cat. IV recruits that recruiters choose to access are likely to compare favorably on other characteristics. (See Dana Brookshire and Anita Hattiangadi, *Emerging Issues In USMC Recruiting: Comparing Relative Attrition Risk Among Marine Corps Recruits*, CRM D0014200.A2/Final, August 2006 for a discussion of this topic.)



## Bootcamp attrition rates: Cat. IV recruits



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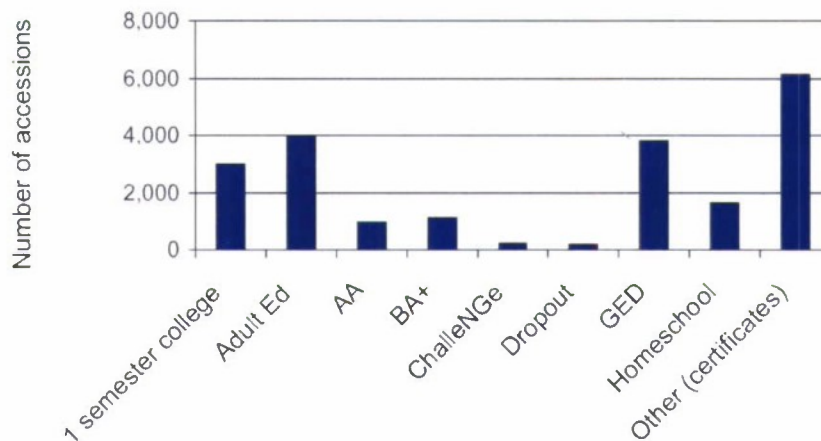
Bootcamp attrition rates for AFQT Cat. IV recruits are higher than overall bootcamp attrition rates (but perhaps not as much higher as some would suspect). In this figure, we show attrition rates by year for the FY79–FY85 accession years and then for the FY96–FY09 period.<sup>8</sup>

As discussed in the previous slide, the Marine Corps allowed more Cat. IV recruits to access in FY07, with the push to increase endstrength to 202,000 active-duty Marines. Note that, in that year, the bootcamp attrition rate for Cat. IV recruits was not that different from the overall bootcamp attrition rate (11.0 percent vice 10.1 percent).<sup>9</sup>

<sup>8</sup>We omit recruits from FY86 through FY95 because there were too few Cat. IV recruits for meaningful tabulations.

<sup>9</sup>In the regressions in appendix A, holding all other variables constant, AFQT Cat. IV accessions had bootcamp attrition rates that were not statistically different from those of other recruits.

## FY03–FY09 accessions by educational background



Note: There also were 203,815 high school diploma graduate accessions in this time period.

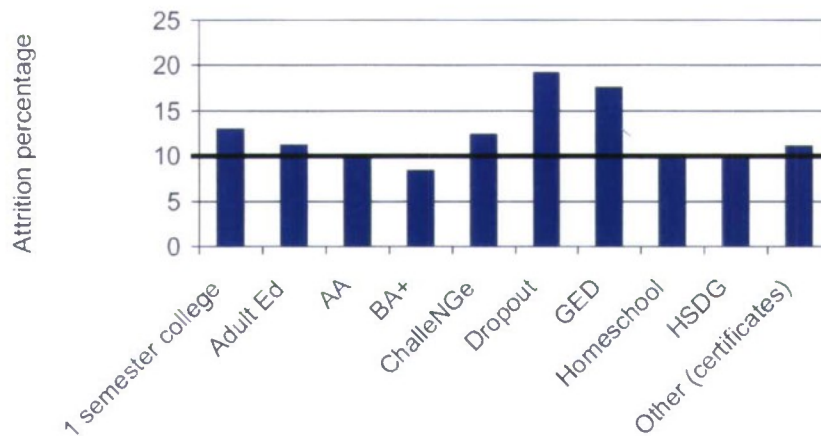
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16

In this slide, we show the number of accessions in the FY03–FY09 period by educational background. To better show the number of accessions in each category, we omit high school diploma graduates from the figure. In this time period, over 90 percent of accessions were high school diploma graduates (203,815).

Tier I recruits are mainly high school diploma graduates, but they also include recruits with 1 semester of college, adult education, Associate degrees (AAs), and Bachelor's degrees (BAs) and beyond. Tier II recruits are those with some type of certificate (here labeled GED and Other). Dropouts are Tier III recruits.

### Bootcamp attrition rates by educational background: FY03–FY09 accessions



Source: CNA's MCAID. 225,356 accessions

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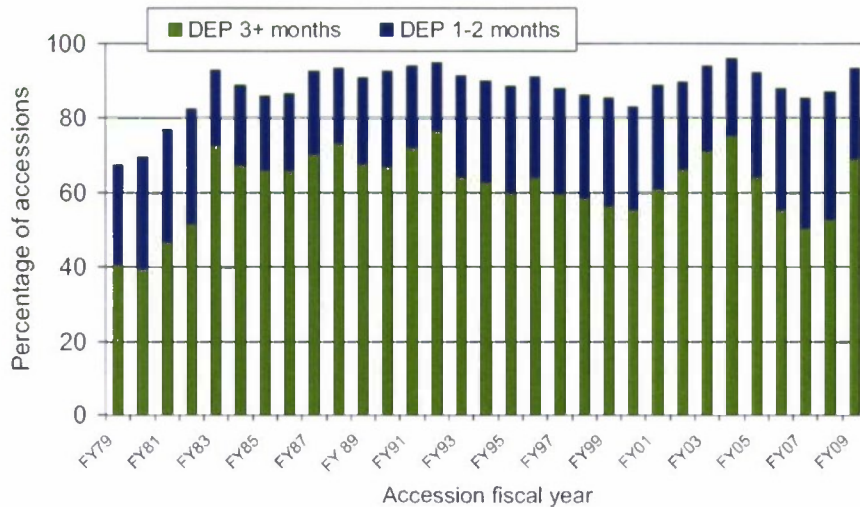
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In this slide, we show bootcamp attrition rates by the recruits' educational background. The solid horizontal line shows the average bootcamp attrition of 10.0 percent over the period. Since the overwhelming majority of recruits are high school diploma graduates (HSDGs), the average bootcamp attrition is very similar to that of HSDGs.

In the FY03–FY09 period, recruits whose educational background included BA degrees (or higher) had the lowest bootcamp attrition rates. ChalleNGe recruits had bootcamp attrition rates slightly above average. The bootcamp attrition rates for dropouts and holders of General Education Development (GED) certificates were very high. Although there are very few dropout accessions, there are fairly substantial numbers of recruits whose educational background was a GED (3,803 in the FY03–FY09 period).



## Accessions: Percentage in DEP



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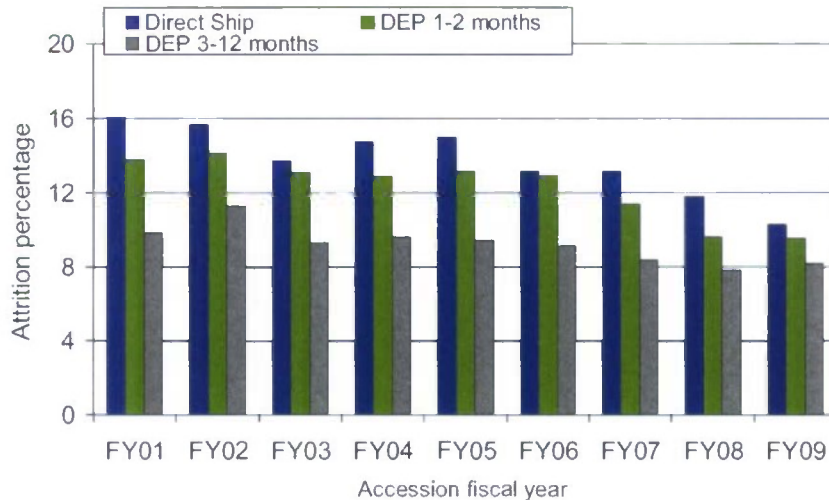
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Some recruits ship within the month that they sign their enlistment contracts, and others will ship in a future month. Those who will ship in a future month are in the Delayed Entry Program (DEP). Here, we show the percentage of recruits who were in the DEP for 1 or 2 months and the percentage who were in for 3 or more months. Previous work has shown that attrition is substantially lower for those who stay in the DEP at least 3 months, probably because they have more time to reflect on their decision to join the Corps and time to learn about the Corps. The Marine Corps has a very active Delayed Entry Program that includes physical training as well as instruction and mentoring in what it means to be a Marine.

Recruits who ship within the month they sign their initial contracts are called direct ships.<sup>10</sup> Clearly, most Marine Corps recruits enter through the DEP.

<sup>10</sup>The difference between the height of the bar and 100 percent of accessions are the direct ships.

## Bootcamp attrition rates by DEP status



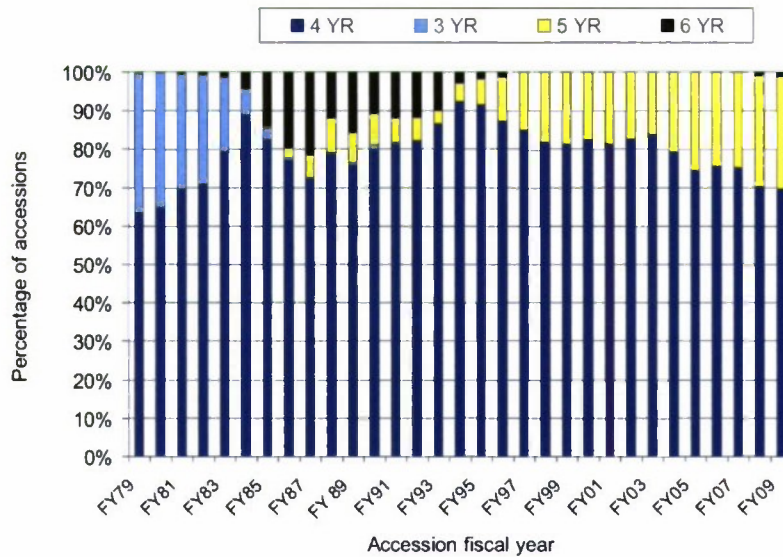
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19

This slide shows the differences in bootcamp attrition rates among those who were direct ships (the blue bars), those in the DEP 1 to 2 months (the light green bars), and those in the DEP for 3 or more months (the dark gray bars). In recent years, as bootcamp attrition has dropped, the differences have narrowed.

In regressions that hold other factors constant, the independent effect of DEP on bootcamp attrition is statistically significant, particularly for a DEP of 3 or more months, which is associated with a reduction in bootcamp attrition of 1.0 percentage point for men and 2.5 percentage points for women (see appendix A).

## Accessions by contract length



Data from FY79 to FY93 from CNA files; data from FY93 to FY10 from MCRC.

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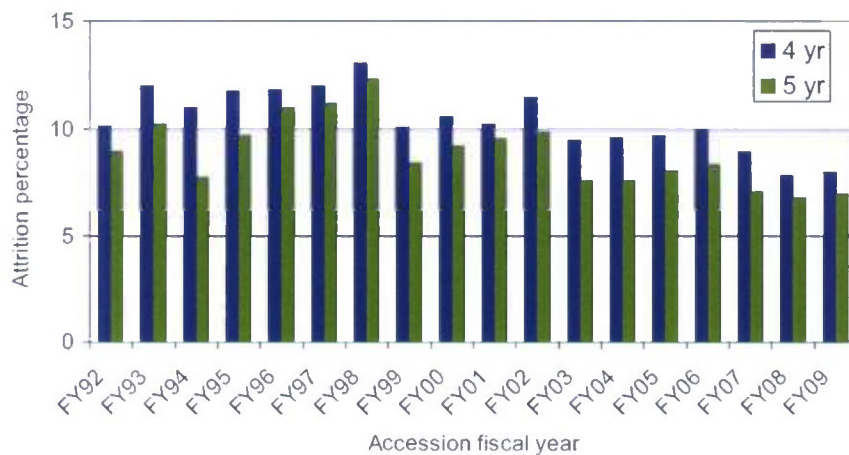
20

This slide shows the distribution of accession contract lengths for FY79 to FY09. In all years, the dominant first-term contract length has been 4 years.

From FY79 to FY83, there were a significant number of 3-year initial enlistment contracts. Six-year contracts started in the early 80's and, by FY87, over 20 percent of accession contracts were for 6 years. In FY86, 5-year enlistment contracts began for small numbers of Marines. While the 3-, 4-, and 6-year initial enlistment contracts were open to the same group of MOSs,<sup>11</sup> the 5-year initial enlistment contracts (which grew substantially in the late 1990s) always have been for a specific group of MOSs (primarily in aviation). Six-year enlistment contracts were discontinued in the mid-1990s but were brought back in FY08 in small numbers.

<sup>11</sup>This means that recruits could choose the length of their enlistment between either 3- and 4-year initial enlistment contracts or, later, between 4- and 6-year enlistment contracts.

### Male high-quality bootcamp attrition rates by contract length



Source: CNA's MCAID.

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21

Historically, bootcamp attrition rates for recruits with 5-year initial enlistment contracts have been lower than those for recruits with 4-year initial enlistment contracts. The difference often has been attributed to a generally higher recruit quality for the 5-year enlistment programs, many of which are in aviation. In this figure, however, we test the robustness of this finding by restricting the comparison to Tier I recruits who test in the upper half of the nationally normed ability distribution (what we call high-quality recruits). Even within this group, attrition rates are lower for those with longer contracts. In the regressions in appendix A that hold all other characteristics constant, the impact of a 5- or 6-year contract was a reduction in bootcamp attrition of 1.8 percentage points for men and 2.4 percentage points for women.



## Longer contracts mean lower bootcamp attrition rates

In FY08, the Marine Corps reestablished 6-year enlistment contracts (it previously had stopped them in FY97). We analyzed bootcamp attrition rates for men:

- For FY08 accessions:
  - 8.8 percent for 4-year obligors
  - 6.9 percent for 5-year obligors
  - 6.9 percent for 6-year obligors
- For FY09 accessions:
  - 8.4 percent for 4-year obligors
  - 7.3 percent for 5-year obligors
  - 6.1 percent for 6-year obligors

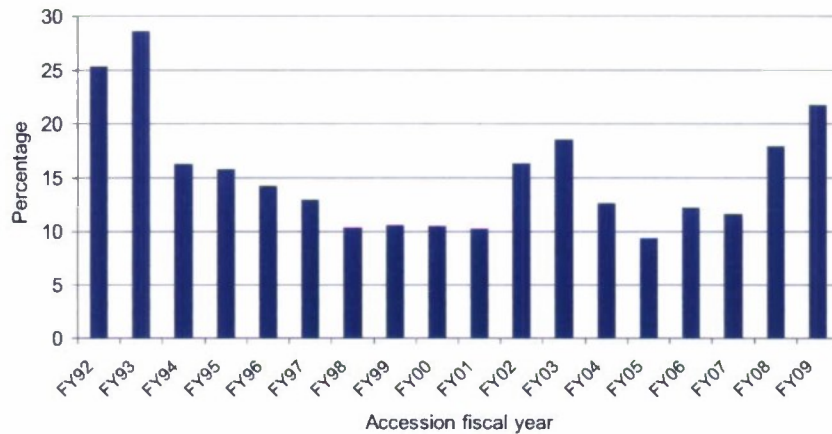


22

As previously discussed, the Marine Corps had substantial numbers of 6-year initial enlistment contracts from FY85 to FY93 and discontinued 6-year contracts in FY97. In FY08, however, the Marine Corps brought back 6-year contracts, though only for a small number of accessions (about 1 percent of accessions each year).

As this slide indicates, bootcamp attrition rates were lower for those with longer initial enlistment contracts. One explanation is that those with a stronger “taste” for the Marine Corps are more likely to sign up for longer enlistment contracts.

## Percentage of accessions with open contracts



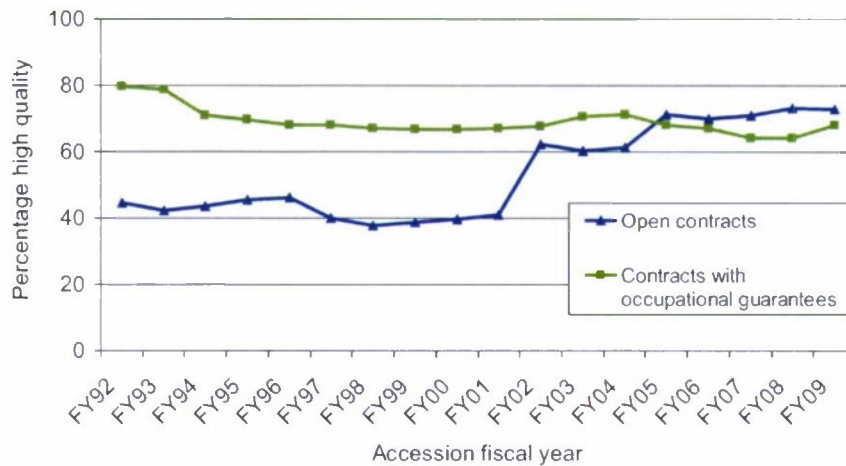
CNA

23

The majority of recruits enter with an enlistment contract that specifies either a specific MOS or a set of related MOSs. For example, code AE for aviation support occupations includes MOSs in aviation ordnance (6500) and airfield services (7000), the UH code is for all occupations in the infantry field (0300), and code 5500 signifies musicians. Some recruits, however, enlist without the promise of an occupational field. Their code is PN, and these are called open contracts. In this slide, we graph the percentage of open contracts over time.

Note that the percentage of open contracts has increased in recent years. Open contracts, are beneficial to the Corps, particularly if the recruits have above-average qualifications. Open contracts provide classification flexibility and allow the Marine Corps to assign these recruits as needed. (For example, it can reduce the individuals' account by assigning these recruits to the schools with the shortest wait times.)

### Percentage of high-quality recruits by contract type

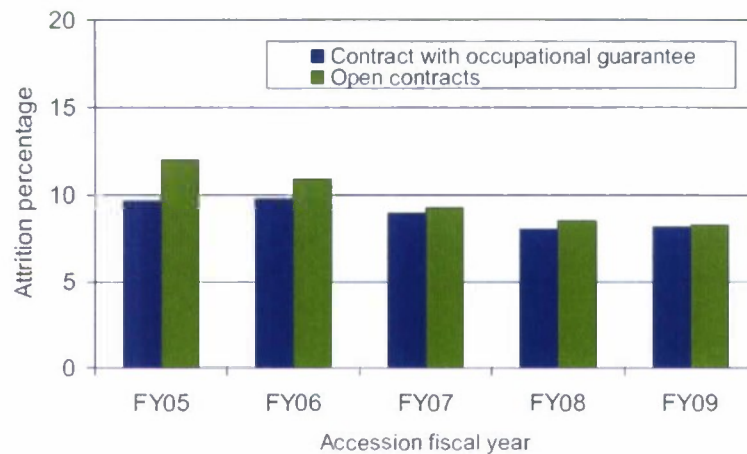


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Here we look at the percentage of high-quality recruits by contract type. Although historically a smaller percentage of recruits with open contracts were high quality, this has changed in recent years. Since FY05, a slightly higher percentage of recruits with open contracts are higher quality than recruits with contracts that have occupational guarantees.

### Bootcamp attrition rates for high-quality recruits with and without an enlistment program



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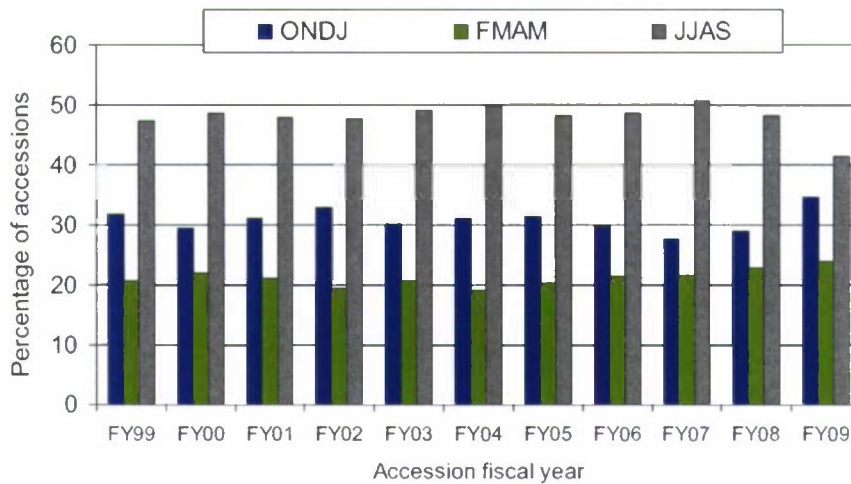
25

This slide shows recent bootcamp attrition rates for high-quality recruits with and without an occupational guarantee. It is important to note that we have restricted the analysis to high-quality recruits.

The Marine Corps substantially increased the percentage of open contracts for accessions in FY08 and FY09. Note that bootcamp attrition rates in these two years are virtually identical for those with open contracts and those with occupational guarantees.



## Percentage of male accessions by season



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26

Marine Corps Recruiting Command divides the year into three seasons:

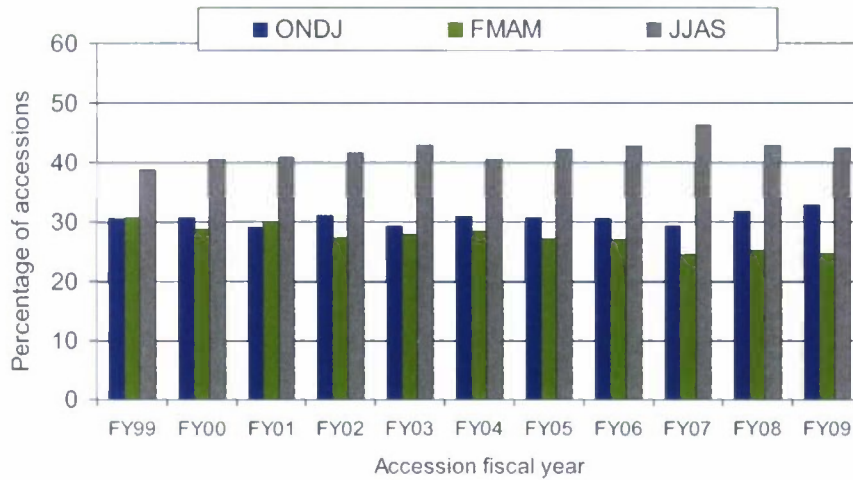
- October, November, December, and January (ONDJ)
- February, March, April, and May (FMAM)
- June, July, August, and September (JJAS).

Forty-three percent of male recruits were recruited as high school seniors in the 11 years from FY99 through FY09. These recruits want to enter the Corps after graduation. Because these recruits are high quality and many would be lost to the Corps if they couldn't enter in JJAS, the Marine Corps brings in almost half of its male recruits in JJAS.

Fall and early winter (ONDJ) is the next most popular season for male recruits, with about 30 percent of male recruits usually entering in this period.

FY09 shows a somewhat different pattern. At the beginning of FY09, the Marine Corps' accession plan was larger than the plan at the end of the FY. In an attempt to avoid exceeding endstrength, the Marine Corps cut planned accessions in the middle of the year. This made the start-of-the-year accessions (ONDJ) a larger proportion than normal and end-of-the-year accessions (JJAS) a smaller proportion than normal.

### Percentage of female accessions by season

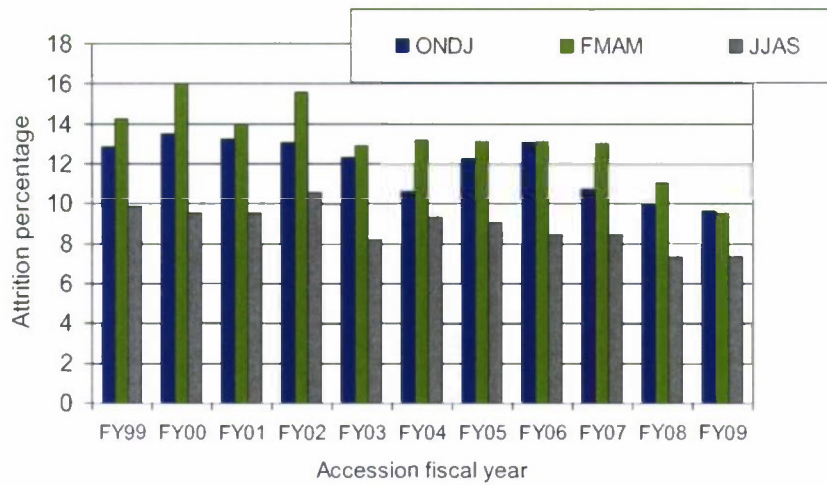


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27

A somewhat smaller proportion of female accessions than male accessions enter in JJAS. Female accessions also are usually more balanced between ONDJ and FMAM than male accessions. JJAS is still the most popular accession session for female recruits, but it is not as dominant as for male recruits. Almost 50 percent of male recruits, but only a little over 40 percent of female recruits, enter in JJAS.

## JJAS accessions have the lowest bootcamp attrition rates



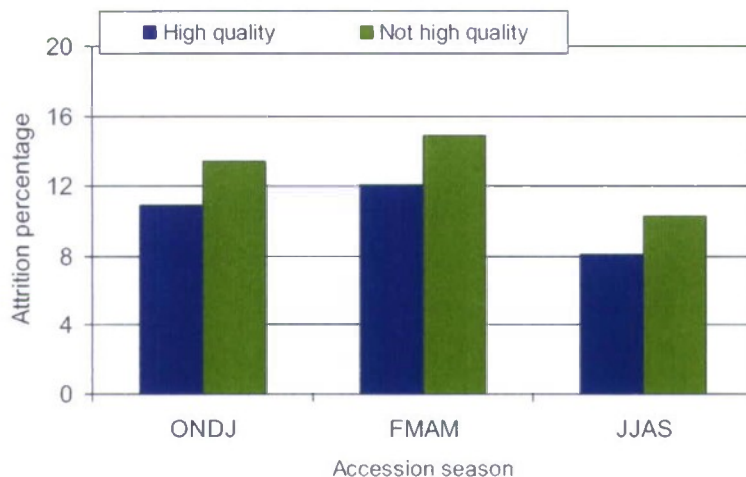
48 percent of the 284,939 accessions entered in JJAS.

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28

More female accessions entering in JJAS have substantially lower bootcamp attrition rates than accessions entering in other seasons. As we discussed earlier, the majority of JJAs accessions are recruited while in high school. These recruits want to start their “new job” in the summer after high school graduation. They are high-quality recruits, and it is in the Corps’ best interest to bring them in when they want to enter.

## All quality groups have lower bootcamp attrition rates in JJAS



High-quality recruits are those with AFQT scores in the 50<sup>th</sup> and higher percentiles and those whose educational credentials are Tier I (352,269 accessions).

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29

To reinforce that JJAS accessions have lower attrition rates than recruits in other seasons, we show attrition rates by quality category for each season's accessions.

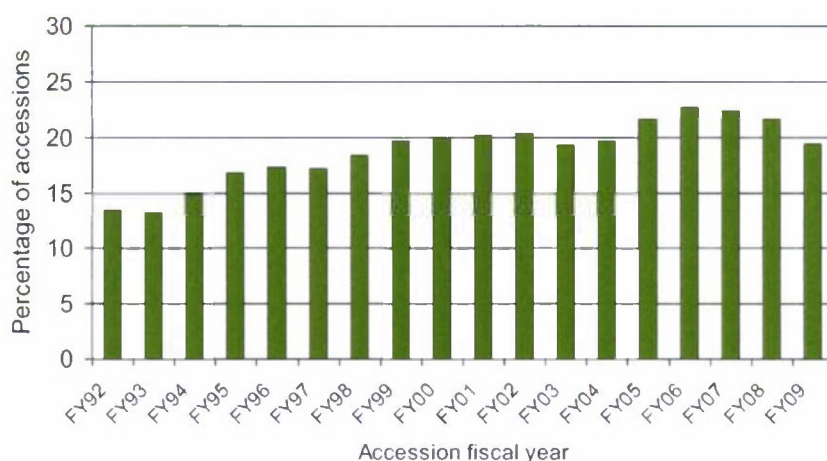
	ONDJ	FMAM	JJAS
High quality	10.9%	12.1%	8.1%
Not high quality	13.4%	14.9%	10.3%

These differences are very large. Some of the differences are explained by the fact that substantial proportions of JJAS recruits were recruited as seniors and participated in the DEP for 3 or more months. There appears, however, to be an independent effect of entering the Corps in the summer. When we use statistical techniques (such as logistic regression analyses) to hold constant the effect of these other variables, entering in JJAS lowers attrition 1.7 percentage points for male recruits and 3.0 percentage points for female recruits (see appendix A). What explains this?

Our hypothesis is that recruits entering in the summer, more than recruits entering in other seasons, are especially excited about becoming Marines and that this excitement creates an atmosphere that fosters success in bootcamp.



### Male accessions: Percentage entering over the retention weight-for-height standard



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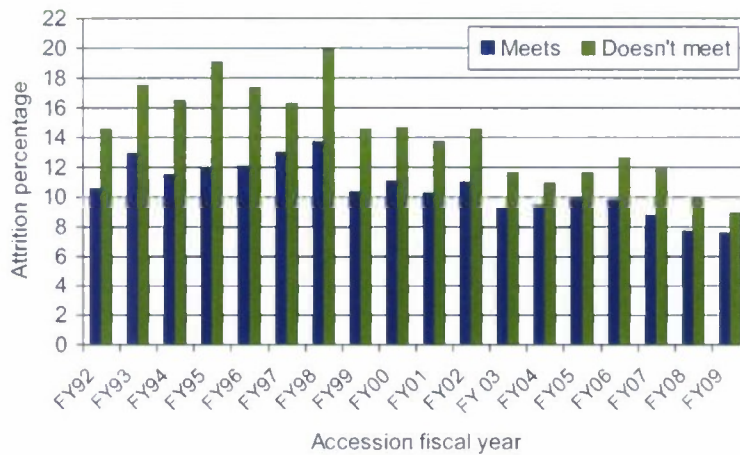
30

CNA has done a lot of work on bootcamp attrition over the years. One of our findings is that male recruits who entered over the retention weight-for-height standard have higher attrition than those who met the retention weight-for-height standard.<sup>12</sup>

The percentage of male recruits entering over the retention weight-for-height standard grew fairly steadily from the early 1990s until about FY99. Since FY99, at least 20 percent of male accessions enter the Marine Corps weighing more than the retention weight-for-height standard.

<sup>12</sup>We use weight-for-height as a proxy for body fat content because we do not have body fat data. We focus on male recruits because the results from female recruits have not been conclusive for this characteristic.

### Male bootcamp attrition rates by whether recruit meets/doesn't meet retention weight-for-height standard



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31

Over the years, we have seen higher male bootcamp attrition for those recruits who do not meet the retention weight-for-height standard. Particularly in the 1990s, the attrition differences were very large. Here we show the bootcamp attrition differences for male recruits entering in FY92 through FY09.

Regressions in appendix A show that, all else equal, male recruits who do not meet the weight-for-height standard have bootcamp attrition rates that are 2.5 percentage points higher than average.

## Number of accessions recruited as high school seniors



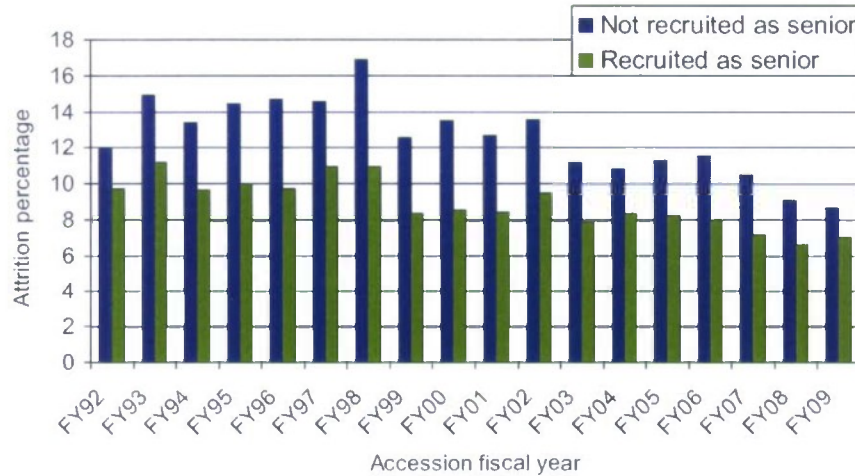
CNA

32

Although virtually all accessions are HSDG, some are recruited while they are still in high school and some are recruited after high school in what is called the “grad market.”

Since FY04, the number of accessions recruited as high school seniors has fallen. Still, in FY09, 40 percent of accessions were recruited as seniors. When the Marine Corps made the push to a 202,000-Marine force, proportionally more recruits were recruited in the grad market. We expect the percentage recruited as seniors to rise now that the 202K endstrength has been achieved and pressure on recruiters has decreased.

### Tier I male bootcamp attrition by whether recruited as senior



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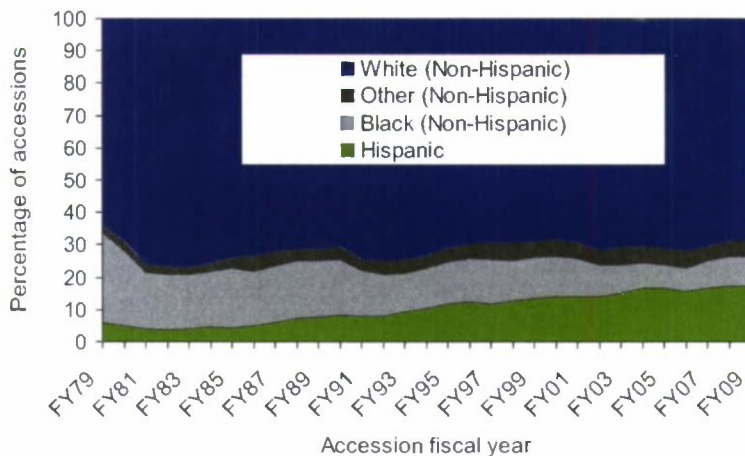
33

Just as the proportion of accessions recruited as seniors has fallen, the differences in bootcamp attrition rates between those recruited as seniors and those not recruited as seniors has narrowed. Still, those recruited as seniors have lower attrition rates. As noted earlier, those recruited as seniors are more likely to have had at least 3 months in the DEP (94 percent for accessions in FY09) and to have accessed in JJAS (75 percent for accessions in FY09).

In the bootcamp attrition regressions displayed in appendix A, holding everything else constant (including time in DEP and JJAS accessions), bootcamp attrition rates for men recruited as seniors are 1.5 percentage points lower than for those not recruited as seniors (for women, 2.2 percentage points lower).



## Accessions: Percentage by race/ethnicity



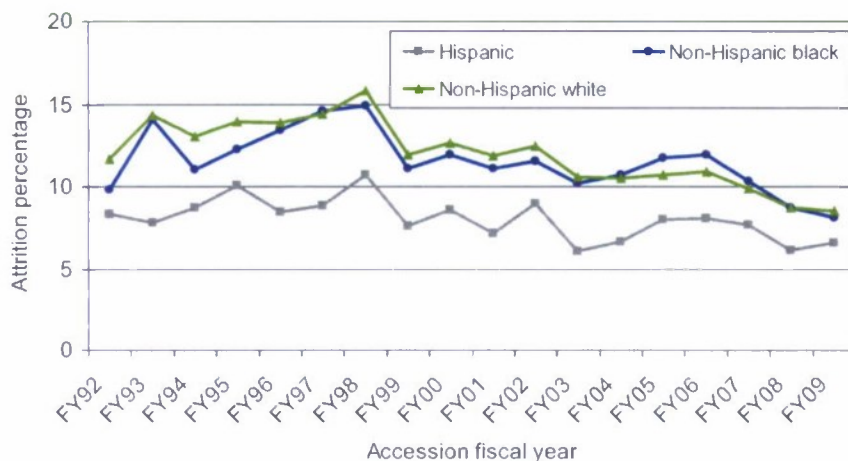
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34

This slide examines the race/ethnicity of recruits over a 30-year period. Probably the most striking change has been the substantial increase in the proportion of accessions that are Hispanic (from 6 percent in FY79 to 17 percent in FY09). The proportion of non-Hispanic black accessions also has fallen fairly dramatically (from 28 percent in FY79 to 9 percent in FY09). These accessions fell first during the first Gulf War and then, even more dramatically, in OEF/OIF.

The “other (non-Hispanic)” race category also grew over the last 30 years, from 2 percent to almost 5 percent. Because the Hispanic and other racial/ethnic categories grew so dramatically over the period, Marine Corps enlisted accessions could be understood to be more ethnically diverse now than they were 30 years ago, when 92 percent of Marine Corps enlisted accessions were either non-Hispanic whites or blacks. However, while there is now more diversity among minority recruits, there is a higher proportion of non-Hispanic white recruits than there was in the past. In FY79, 64 percent of recruits were non-Hispanic whites; in FY09, the percentage was 69.

## Male bootcamp attrition rates by race/ethnicity



Source: CNA's MCAID.

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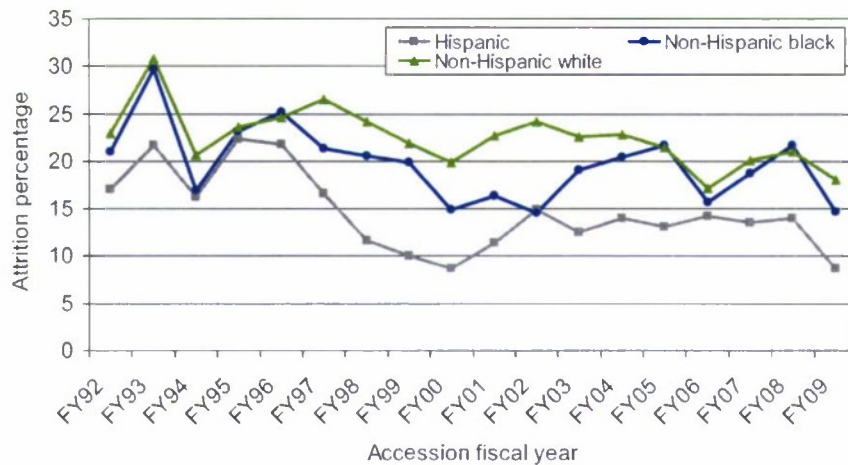
35

Hispanic recruits have exceptionally low bootcamp (and first-term) attrition rates. We have done extensive analyses of this, and our main finding has been that, holding all other characteristics constant, Hispanic recruits have considerably lower attrition rates than other groups.<sup>13</sup> The dominant “explanation” for very low bootcamp attrition rates is a determination not to disappoint parents and teachers by failing to complete bootcamp. At first, this explanation seemed a little strange since Hispanic young men and women have high school dropout rates that are exceptionally high. It is important to note, however, that virtually all Hispanic Marine Corps recruits have completed high school. In fact, it may be that completion of what you start is more important to Hispanic recruits than it is to other recruits simply because these recruits have already bucked their demographic tendencies by completing high school.

As the figure shows, male Hispanic recruits have average bootcamp attrition rates that are consistently about two-thirds the rates for other recruits.

<sup>13</sup>The bootcamp attrition regressions in appendix A show that, relative to non-Hispanic white male recruits, bootcamp attrition rates for male non-Hispanic black recruits are 1.0 percentage point lower, rates for male non-Hispanic other-race recruits are 2.8 percentage points lower, and rates for male Hispanic recruits are 4.0 percentage points lower.

## Female bootcamp attrition rate by race/ethnicity



Source: CNA's MCAID.

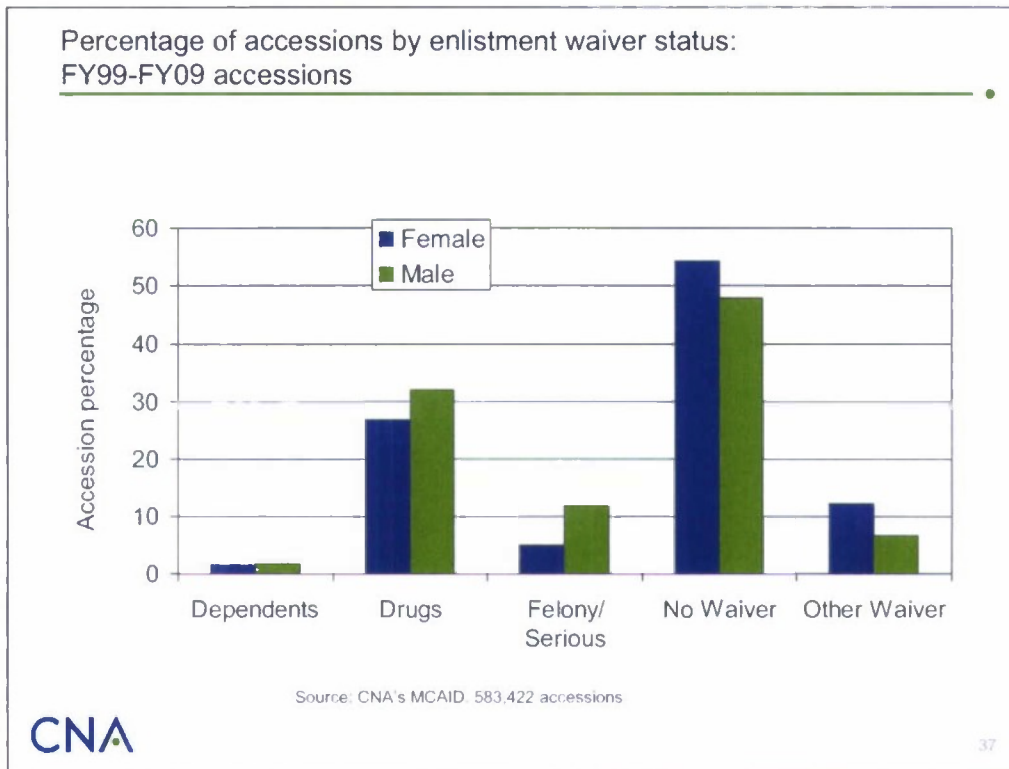
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36

Female Hispanic recruits also have lower attrition than recruits from other racial/ethnic backgrounds. The data series for women, however, is noisier than that for men because the number of female recruits is small.<sup>14</sup> In FY09, the female bootcamp attrition rates were:

- 8.7 percent for Hispanic recruits
- 14.7 percent for non-Hispanic black recruits
- 18.1 percent for non-Hispanic white recruits.

<sup>14</sup>Minority female recruits historically have had very low attrition rates. As the bootcamp attrition regressions in appendix A show, relative to non-Hispanic white female recruits, bootcamp attrition rates for female non-Hispanic black recruits are 4.1 percentage points lower, rates for female non-Hispanic other race recruits are 5.0 percentage points lower, and rates for female Hispanic recruits are 8.9 percentage points lower.



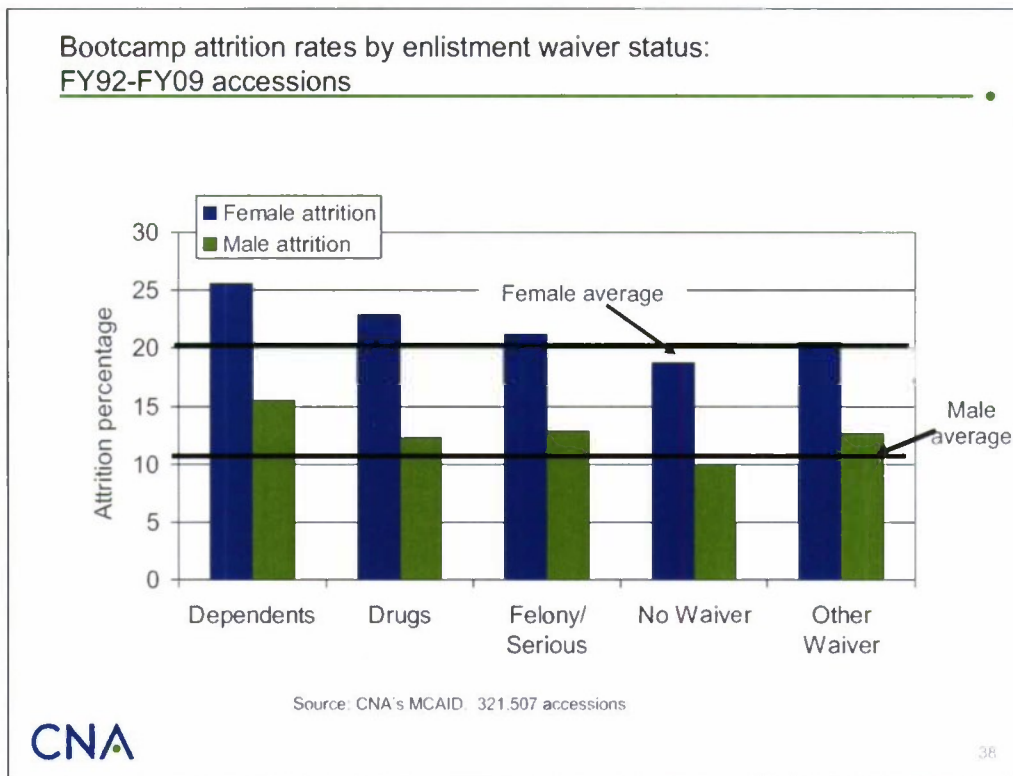
Now, we turn to the distribution of accessions by enlistment waiver status. It should be noted that waiver criteria vary between services; therefore, counts and percentages cannot be compared across services. The Marine Corps issues more waivers than the other services, which is generally attributable to higher standards (mainly a Marine Corps policy that requires a waiver for even one time marijuana use) and thorough applicant screening. The Marine Corps also requires waivers for all law enforcement violations, including parking tickets, traffic tickets, and court cases where the adjudication is expunged, sealed, or deferred.

In FY08, OSD worked with the services to establish guidance and policy for collecting and reporting waiver data. Common terms, offense categories, and reporting codes were established. DoD guidelines beginning in FY09 define what requires a waiver, and/or service review and creates uniform standards across the services. In future work, we will be able to compare these new data across services.

In the slide above, we show enlistment waiver distributions separately for male and female recruits since waiver patterns differ by gender. Specifically:

- Female recruits are less likely than male recruits to have an enlistment waiver; they are particularly less likely to have a felony, serious misdemeanor, or a drug waiver.
- However, female recruits are about twice as likely as male recruits to have an “other” waiver. These are primarily administrative waivers.





In this slide, we show average male and female bootcamp attrition rates over the FY99–FY09 period, as well as the attrition rates by the various waiver types. Although the number of waivers for dependents is not large, both men and women with dependent waivers have substantially higher bootcamp attrition than do other groups. Similarly, bootcamp attrition is higher than average for women with drug waivers and for both men and women with other waivers.

In the bootcamp attrition regressions in appendix A, the independent effects of specific waivers (relative to no waiver) were:

- For men:
  - Felony/serious misdemeanor waivers: an increase of 0.4 percentage points
  - Drugs: an increase of 1.1 percentage points
  - Dependents: an increase of 3.8 percentage points
  - Other waivers, including physical waivers: an increase of 2.4 percentage points.
- For women:
  - Felony/serious misdemeanor waivers: no statistically significant effect
  - Drugs: an increase of 3.3 percentage points
  - Dependents: an increase of 6.6 percentage points<sup>15</sup>
  - Other waivers, including physical waivers: an increase of 2.5 percentage points.

<sup>15</sup> Unlike other characteristics associated with higher or lower attrition, the effect of a dependent waiver on female attrition appears to be restricted to bootcamp attrition. Dependent waivers are not statistically significant for female first-term attrition in the regressions in appendix A.

### Bootcamp separation reasons: FY99–FY09 accessions

- Separation reasons are generally not very revealing
- 60 different 4-digit separation codes were used, BUT
  - 5 codes represented 91 percent of the separations
  - 10 codes represented 97 percent of the separations
  - 15 codes represented 99 percent of the separations
- Appendix B has examples of code usage
  - For men over the years at Parris Island and San Diego
  - For women at Parris Island

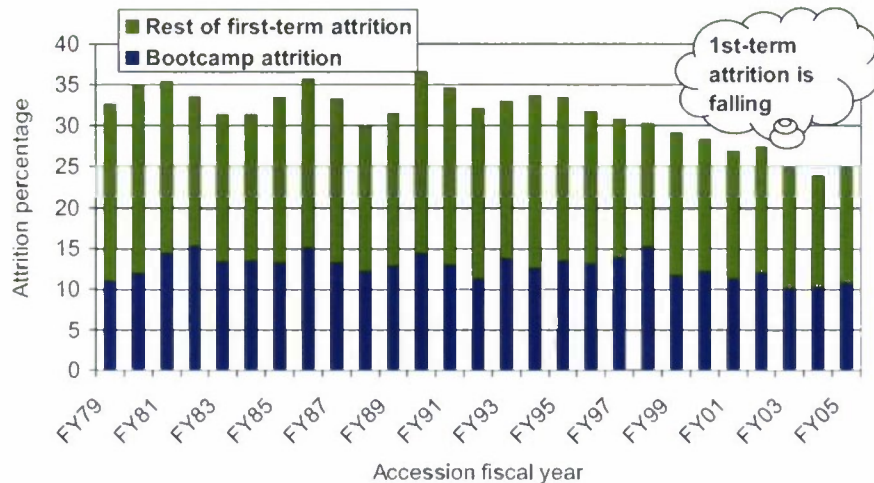
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39

### Bootcamp separations for FY99 to FY09 accessions

<u>Reason code</u>	<u>Number</u>	<u>Percentage</u>	
JDA1	12,080	32%	Fraudulent enlistment
JGA1	8,584	23%	Entry-level conduct and performance
JFV1	6,182	16%	Involuntary discharge (COG- not a disability)
JDT1	3,775	10%	Fraudulent enlistment, drugs (no board)
HFC1	3,706	10%	Erroneous enlistment, other (board waived)
JFL1	715	2%	Involuntary discharge (physical disability, severance pay)
SFK1	584	1%	Separated to temporary disabled retired list (TDRL)
JFX1	411	1%	Involuntary discharge (no bd) personality disorder
JDA3	398	1%	Involuntary discharge (fraudulent enlistment police record)
HRB1	268	1%	Involuntary discharge (bd waived) homosexual admission

## Male 4-year obligors: First-term attrition rates



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Source: CNA's MCAID.

40

In this slide, we examine what has happened to first-term attrition rates over time for male 4-year obligors.<sup>16</sup>

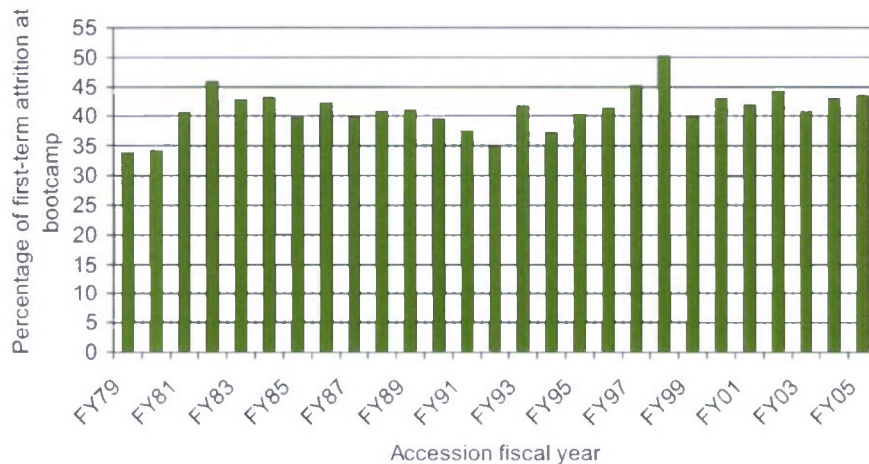
The most compelling feature of the figure is the sharp drop in first-term attrition rates in recent years. To get a better sense of this dramatic drop, consider first-term attrition rates for these male 4-year obligors:

- 36.5 percent for those accessed in FY90
- 33.5 percent for those accessed in FY95
- 24.8 percent for those accessed in FY05.

The figure divides first-term attrition into that occurring at bootcamp and that occurring after bootcamp. The Marine Corps always has taken a substantial portion of attrition at bootcamp. We turn to that next.

<sup>16</sup>Since we are looking 4 years from the accession year, FY05 is the last year for which we can track this attrition.

### Percentage of first-term attrition at bootcamp: Male 4-year obligors



Source: CNA's MCAID.

CNA

41

Here we show the percentage of first-term attrition that has been taken at bootcamp.<sup>17</sup> Although it varies, it has been a little over 40 percent in most years.

Because male accessions go to both bootcamps, it is possible to make yearly attrition comparisons. We have looked at this in the past and generally found that, if male attrition is higher at one bootcamp than another in a particular year, the overall first-term attrition rate will be higher for those who accessed through that bootcamp. We turn to this on the next slide.

<sup>17</sup>Again, we must end with the FY05 accession cohort since that is the most recent cohort for which we can know the total amount of first-term attrition.



## Do higher bootcamp attrition rates mean higher overall attrition rates?

- Need to ensure that comparisons are valid
  - Used male 4-year obligors
  - Compared attrition at Parris Island (PI) and San Diego (SD) by accession year
    - Within-year quality differences for men are very small
  - Used years in which the attrition was at least 2 percentage points different at the two depots
- Found very strong evidence that high bootcamp attrition is associated with high first-term attrition. Why should that be?
  - Part is mechanical because bootcamp attrition is a big part of first-term attrition
  - However, if the bootcamps could identify those who would attrite later, there should be no overall first-term attrition differences
  - Since there are first-term attrition differences, there is no evidence that the bootcamps, by attriting more, are identifying (and attriting) those who would attrite later

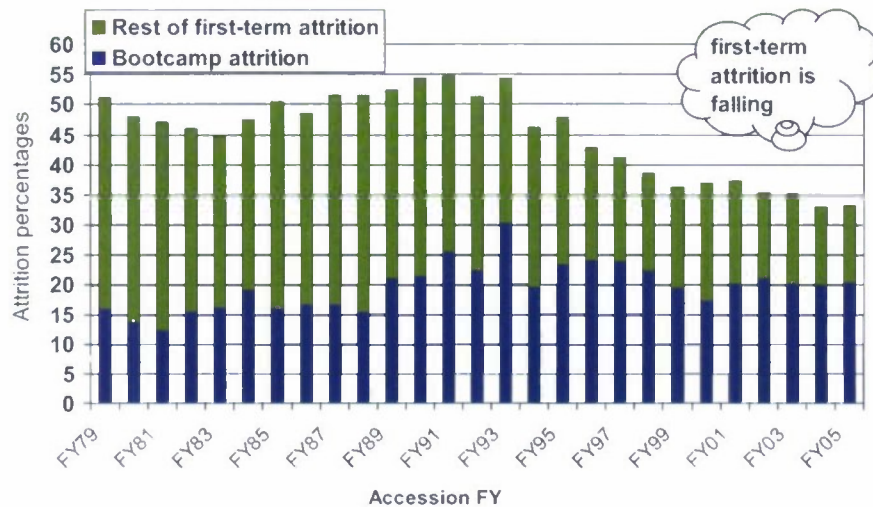


42

The table below shows bootcamp and first-term attrition for male 4-year obligors who went through PI or SD. The years displayed are all in the FY99–FY05 accession period for which the attrition differences between PI and SD were at least 2 percentage points. If higher bootcamp attrition led to higher first-term attrition, the data are shown in red. Since FY79, there have been 11 years in which male bootcamp attrition rates across MCRDs differed by at least 2 percentage points. For 10 of those years, first-term attrition rates were higher for recruits who went through the depot with the higher attrition rates. In short, for men, there is no evidence that extra attrition at the depot will mean lower attrition later in the operating forces.

<u>Accession FY</u>	<u>MCRD (first-term attrition rate)</u>	
	<u>PI</u>	<u>SD</u>
FY82	12.4 (30.5)	18.3 (36.5)
FY83	14.4 (31.5)	12.3 (31.2)
FY85	15.0 (33.9)	11.6 (33.0)
FY86	17.4 (37.8)	13.2 (33.9)
FY89	14.3 (33.8)	11.9 (29.7)
FY90	17.2 (39.7)	12.4 (34.2)
FY91	16.8 (37.7)	10.0 (32.1)
FY93	15.7 (34.8)	12.1 (31.5)
FY96	14.7 (34.4)	11.8 (29.4)
FY98	17.5 (32.8)	13.1 (28.2)
FY01	9.8 (26.7)	12.6 (27.2)

## Female 4-year obligors: First-term attrition rates



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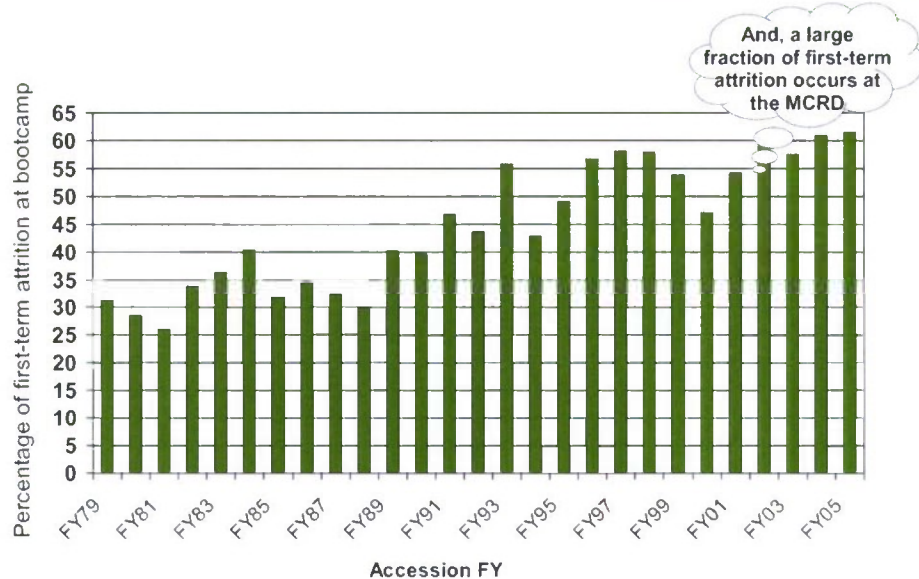
Source: CNA's MCAID.

43

This figure shows bootcamp and the rest of first-term attrition for female 4-year obligors. Similar to the pattern for men, overall first-term attrition rates (the height of the bars) have been coming down sharply: For FY93 female 4-year obligors, the first-term attrition rate was 54.4 percent; for FY05 female 4-year obligors, it was 33.2 percent!

Although first-term attrition rates have been falling, the portion of attrition taken at bootcamp hasn't fallen at all. In fact, it may be rising. We examine that next.

## Percentage of first-term attrition at bootcamp: Female 4-year obligors



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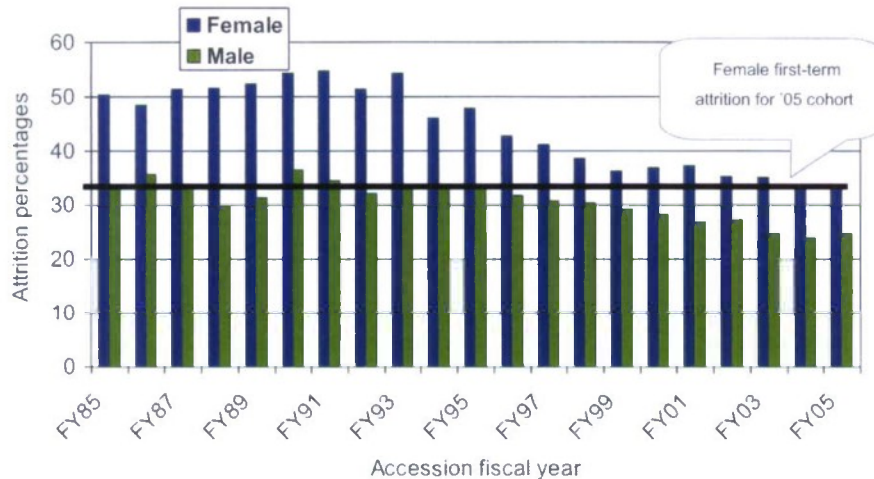
Source: CNA's MCAID.

44

As is clear from this figure, a substantially higher percentage of first-term attrition for women than for men occurs at bootcamp. In recent years, the percentage has reached 60 percent! This suggests a very different story for female accessions than for male accessions as to the effect of higher bootcamp attrition on overall first-term attrition:

- For men, substantially higher bootcamp attrition at one depot appears to lead to higher overall first-term attrition. This suggests that, on the margin, bootcamps cannot identify those who would attrite later.
- Although we cannot do the same analysis for women because they all enter through one depot, it does appear that very high levels of bootcamp attrition are associated with low levels of first-term attrition.

## Male and female first-term attrition rates: 4-year obligors



Source: CNA's MCAID.

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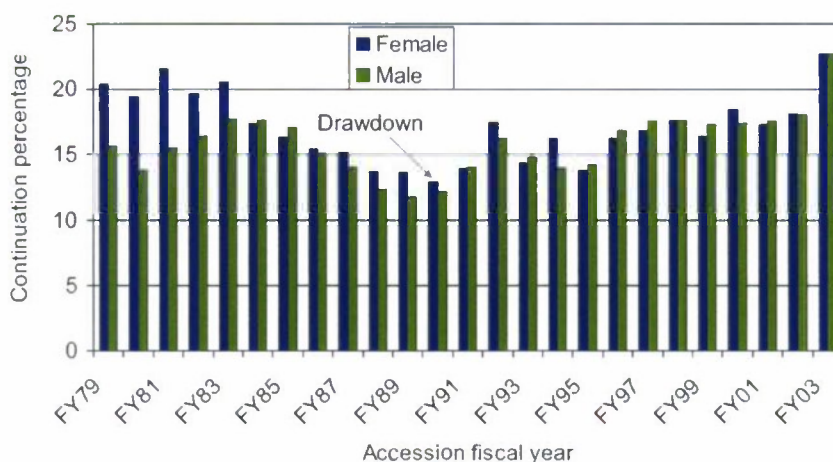
45

To show how dramatically female attrition has fallen, we graph first-term attrition rates for male and female obligors who entered from FY95 through FY05. As the solid horizontal bar shows, female first-term attrition is now at the level of male first-term attrition for the FY85–FY96 accession cohorts!

In fact, both male and female first-term attrition rates have fallen, but female attrition rates have fallen more sharply. In the early years of our analysis, female first-term attrition was 50 percent higher than male attrition. For the most recent cohorts, female attrition has averaged 34 percent higher than male attrition.



## Street to fleet: 73-month continuation rates



Source: CNA's MCAID.

CNA

46

Before concluding this analysis, we take a quick look at continuation rates beyond the first term of service. This figure illustrates the percentage of accessions that are still in the Corps after 73 months of service.<sup>18</sup>

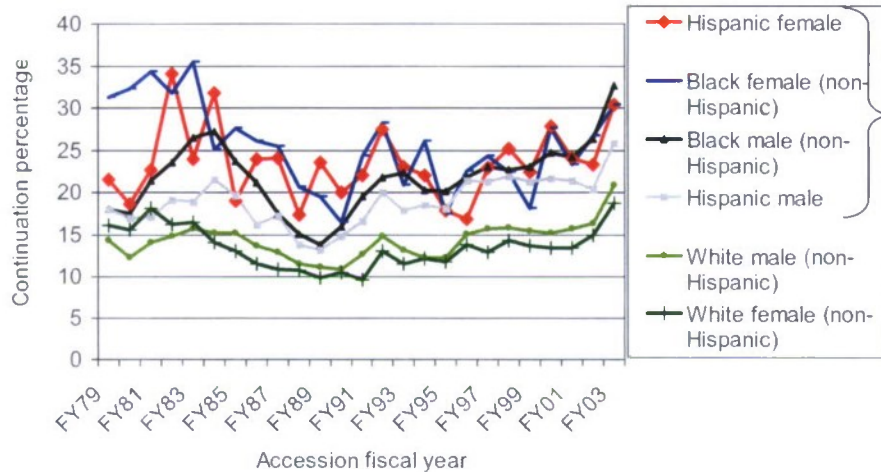
Although most Marine Corps manpower analysts have long been aware of high bootcamp and first-term attrition rates for women Marines, few seem aware that—despite these early losses—long-term continuation rates for women exceed those for men. This is true for virtually all the accession cohorts that entered from FY79 to FY94.<sup>19</sup>

For cohorts entering since FY95, long-term continuation rates have been more equal across the genders. Although in some years the female rate is slightly above the male rate, in other years, the male rate is slightly above the female rate.

<sup>18</sup>Since we are looking at more than 6 years of service, the most recent accession cohort we can analyze is those who entered in FY03.

<sup>19</sup>Those entering in FY94 would have completed 6 years of service by FY00.

### Street to fleet: 73-month continuation rates by race/ethnicity



Source: CNA's MCAID.

**CNA**

47

This slide shows 73-month continuation rates by race/ethnicity. Hispanic and non-Hispanic black women historically have had the highest continuation rates. The continuation rates for black men, however, are very close to these rates and, for accessions entering in FY03, black men had the highest continuation rates of any racial/ethnic group. Continuation rates for Hispanic men are high, but generally below the rates for Hispanic women, non-Hispanic black women, and black men.<sup>20</sup> The lowest long-term continuation rates are for non-Hispanic white men and women. These 73-month continuation rates, however, rose for all groups for the FY03 accession cohort.<sup>21</sup>

<sup>20</sup>Future work could examine more detailed characteristics of successful minority recruits.

<sup>21</sup>The FY03 accession cohort is the most recent cohort we can observe for 73 months. Accessions in FY03 would have completed 73 months of service in FY09.

## Summary

- Bootcamp attrition rates have fallen in recent years
  - Women are more likely to attrite later in bootcamp than men
- Bootcamp attrition rates are lower for those who:
  - Have higher AFQT scores
  - Have better education credentials
  - Spend 3 or more months in the DEP
  - Have longer initial contracts
  - Ship to bootcamp in JJAS
  - Meet the height-for-weight standard
  - Were recruited as high school seniors
  - Access without enlistment waivers
- First-term attrition rates have fallen
  - More dramatic for women than for men
  - Higher bootcamp attrition does not translate into lower first-term attrition for men, but it may be the case for women
- Long-term (73-month) continuation rates are highest for minorities



48

This slide summarizes our findings. We find that bootcamp attrition rates have fallen in recent years, and that women are more likely than men to attrite later in bootcamp.

By examining the relationship between recruit characteristics and bootcamp attrition rates over time, we find that bootcamp attrition rates are lower for those who:

- Have higher AFQT scores
- Have better educational credentials
- Spend 3 or more months in the DEP
- Have longer initial contracts
- Ship to bootcamp in JJAS
- Meet the height-for-weight standard
- Were recruited as seniors
- Access without enlistment waivers.

We find that first-term attrition rates also have fallen over time—especially for women. Higher bootcamp attrition translates into higher first-term attrition for men, but this is not the case for women.

Finally, when we examine long-term behavior, we find that 73-month continuation rates are highest for minority (black and Hispanic) Marines.

## **Appendix A: Multivariate analyses of bootcamp and first-term attrition**





Table 1 shows the logistic regression results of our analysis of bootcamp attrition for recruits who entered the Corps from FY99 through FY09. Regressions are done separately for male and female recruits. All the marginal effects hold the other independent variables at their means and examine the effect of changing the variable of interest. If there are multiple categories of the variable (race/ethnicity or enlistment waiver, for example), the effect is relative to the omitted category (non-Hispanic white or no enlistment waiver). The explanatory variables are the same variables that we have explored earlier in this annotated briefing.

The logistic regression results reinforce the tabulations reported in the main body of this briefing. Minority recruits tend to have lower bootcamp attrition rates than white non-Hispanic recruits. The effect is strongest for Hispanic recruits who, other things equal, have bootcamp attrition rates that are 4.0 percentage points lower for men and 8.9 percentage points lower for women.

High-quality recruits (Tier I and AFQT scores in the 50<sup>th</sup> percentile and above) have lower attrition rates than lower-quality recruits: 2.1 percentage points for men and 2.4 percentage points for women.

Male recruits entering through Parris Island, other characteristics equal, have slightly lower attrition rates than male recruits entering through San Diego (0.4 percentage point).

Entering through the Delayed Entry Program (DEP) drops the male attrition rate by 1.2 percentage points; being in DEP for 3 or more months drops the male attrition rate by another 1.0 percentage point. Female bootcamp attrition rates are not affected by short DEP durations, but DEP stays of 3 or more months are associated with a 2.5-percentage-point reduction in the attrition rate.

Relative to no enlistment waiver, having a felony or serious misdemeanor waiver raises the male attrition rate by 0.4 percentage point; other things equal, it has no impact on the female attrition rate. Large percentages of male and female recruits enter with some type of drug waiver (29.4 percent of men and 24.5 percent of women). The impact on attrition, all else equal, is 1.1 percentage points for men and 3.3 percentage points for women. Although very few male or female recruits enter with waivers for dependents (1.3 percent of men and 1.6 percent of women), other things equal, attrition is considerably higher for these recruits (3.8 percentage points for men and 6.6 percentage points for women). Finally, other things equal, recruits with other waivers have higher attrition—2.4 to 2.5 percentage points higher. The other waiver category includes physical waivers, as well as other assorted waiver categories.

Recruits who were recruited as high school seniors have lower attrition than those who were not recruited as seniors (1.5 percentage points for men and 2.2 percentage points for women). A large percentage of these recruits enter in JJAS; entering in JJAS, all things equal, lowers attrition (1.7 percentage points for men and 3.0 percentage points for women).

Other things equal, meeting the retention weight-for-height standard lowers attrition for men by 2.5 percentage points but raises it for women by 1.2 percentage points.<sup>1</sup> We have no explanation for this latter result.

Recruits with contract guarantees (not open contracts) had attrition rates that were 1.4 percentage points lower for men and 2.3 percentage points lower for women. Recruits with longer contracts (5 or 6 years) also had lower bootcamp attrition rates (1.8 percentage points for men and 2.4 percentage points for women). Finally, holding all other variables constant, recruits in AFQT category IV had bootcamp attrition rates that were not statistically different from those of other recruits.

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1. We used separate tables by gender for the retention weight-for-height standard.

Table 1. Logistic regression for bootcamp attrition for recruits accessed FY99 through FY09

	Men			Women		
	Mean	Coefficient (t statistic)	Marginal Effect	Mean	Coefficient (t statistic)	Marginal Effect
Race/ethnicity						
Black	.093	-0.109** (-5.36)	-0.010	.148	-0.267** (-5.47)	-0.041
Hispanic	.152	-0.493** (-26.11)	-0.040	.190	-0.656** (-13.31)	-0.089
Other	.046	-0.328** (-10.74)	-0.028	.061	-0.330** (-4.53)	-0.050
High quality	.618	-0.233** (-18.77)	-0.021	.648	-0.156** (-4.24)	-0.024
MCRD Parris Island	.477	-0.039** (-3.26)	-0.004	1.000		Not appl.
Entered through DEP	.892	-0.126** (-76.71)	-0.012	.891	-0.006 (-0.12)	Not sig.
DEP 3 or more months	.616	-0.115** (-7.55)	-0.010	.586	-0.169** (-4.13)	-0.025
Enlistment waiver						
Felony or serious misdemeanor	.114	0.046* (2.43)	0.004	.052	-0.03 (-0.35)	Not sig.
Drugs	.294	0.121** (8.98)	0.011	.245	0.212** (5.36)	0.033
Dependents	.013	0.370** (8.39)	0.038	.016	0.4397** (3.38)	0.066
Other	.055	0.247** (10.09)	0.024	.150	0.162** (3.36)	0.025
Meets retention weight/height	.793	-0.259** (-18.94)	-0.025	.774	0.082* (2.05)	0.012
Recruited as senior	.432	-0.166** (-10.17)	-0.015	.397	-0.147** (-3.33)	-0.022
Entered in JJAS	.480	-0.195** (-14.11)	-0.017	.421	-0.200** (-5.20)	-0.030
Contract guarantee	.869	-0.149 (-8.93)	-0.014	.776	-0.154 (-3.90)	-0.023
5- or 6-year obligor	.224	-0.208 (-13.49)	-0.018	.196	-0.164 (-3.66)	-0.024
AFQT Category IV	.015	-0.051 (-1.15)	Not sig.	.007	0.052 (0.28)	Not sig.
Constant		-1.435** (-62.54)			-0.978** (-13.87)	
Observations		326,247			24,966	
Chi square		3,640.4			496.2	
Average bootcamp attrition rate		10.1			18.7	

Absolute value of z statistics in parentheses

\* significant at 5%; \*\* significant at 1%

Table 2 shows logistic regression results from our analysis of 45-month attrition for 4-, 5-, and 6-year obligors who entered the Corps from FY99 through FY05. We used 45-month attrition as a proxy for first-term attrition, including 5- and 6-year obligors in the estimation. Regressions are done separately for men and women. The regressors are the same as we used for bootcamp attrition; all characteristics are at the time of accession. Generally speaking, factors that are statistically significant in explaining bootcamp attrition also are statistically significant in explaining first-term attrition. The effects, however, often are larger for first-term attrition than for bootcamp attrition.



Table 2. Logistic regression for 45-month attrition for 4-, 5-, and 6-year obligors accessed FY99 through FY05

	Men			Women		
	Mean	Coefficient (t statistic)	Marginal Effect	Mean	Coefficient (t statistic)	Marginal Effect
Race/ethnicity						
Black	0.100	-0.107** (-6.13)	-0.020	.150	-0.463** (-9.101)	-0.104
Hispanic	0.145	-0.521** (-31.52)	-0.089	.172	-0.818** (-15.87)	-0.173
Other	0.047	-0.379** (-14.40)	-0.067	.060	-0.6599** (-7.76)	-0.131
High quality	0.620	-0.287** (-26.12)	-0.054	.671	-0.211** (-5.19)	-0.470
MCRD Parris Island	0.474	0.030** (2.84)	0.006	1.000	Not applicable	
Entered through DEP	0.897	-0.159** (-9.03)	-0.030	.901	-0.013 (-0.21)	Not sig.
DEP 3 or more months	0.644	-0.235** (-17.56)	-0.046	.609	-0.245** (-5.62)	-0.055
Enlistment waiver						
Felony or serious misdemeanor	0.103	0.250** (14.49)	0.048	.045	0.189* (2.28)	0.043
Drugs	0.327	0.249** (21.48)	0.047	.282	0.230** (5.66)	0.051
Dependents	0.012	0.254** (5.67)	0.050	.0127	0.153 (1.02)	Not sig.
Other	0.050	0.144** (6.04)	0.027	.156	-0.030 (-0.57)	Not sig.
Meets retention weight/height	0.799	-0.149** (-11.77)	-0.028	.842	0.026 (0.56)	Not sig.
Recruited as senior	0.459	-0.099** (-6.91)	-0.018	.410	-0.170** (-3.72)	-0.037
Entered in JJAS	0.484	-0.086** (-7.10)	-0.016	.411	-0.105** (-2.62)	-0.023
Contract guarantee	.883	-.077** (-4.87)	-0.014	.749	-0.137 (-3.31)	-0.031
5- or 6-year obligor	0.192	-0.263** (-18.45)	-0.047	.173	-0.033 (-0.71)	Not sig.
AFQT Category IV	0.102	-0.158** (3.22)	-0.031	.004	-0.027 (-0.11)	Not sig.
Constant		-0.338** (-13.44)			0.082 (1.01)	
Observations		165,324			12,657	
Chi square		5,450.4			571.9	
Average first-term attrition rate		25.4			35.7	

Absolute value of z statistics in parentheses  
 \* significant at 5%; \*\* significant at 1%

Table 3 presents only the marginal effects of each variable on bootcamp and 45-month attrition. The table presents no new information, but it provides a more convenient format for comparing the effects on attrition at bootcamp or over the first 45-months of service. Here we have bolded the marginal effects for 45-month attrition that are at least double in magnitude of those for bootcamp attrition. For example, the marginal effect for men of 3 or more months in DEP is a reduction in bootcamp attrition of 1.0 percentage point and a reduction in 45-month attrition of 4.6 percentage points. For women, the effects are 2.5 and 5.5 percentage points, respectively. We speculate that a DEP of this length allows a recruit to reflect on the decision to join the Marine Corps and that probably reduces bootcamp attrition since some recruits drop out of the DEP and never enter the Corps. Another effect of DEP, however, is that it makes it more likely that the recruit will be able to find a better occupational fit. Direct ship recruits' occupational choices may not fit with school seat availabilities.

Table 3. Comparison of the marginal effects from bootcamp and first-term attrition logistic regressions

	Male attrition		Female attrition	
	MCRD	First term	MCRD	First term
Black	-0.010	<b>-0.020</b>	-0.041	<b>-0.104</b>
Hispanic	-0.040	<b>-0.089</b>	-0.089	<b>-0.173</b>
Other	-0.028	<b>-0.067</b>	-0.050	<b>-0.131</b>
High quality	-0.021	<b>-0.054</b>	-0.024	<b>-0.470</b>
MCRD Parris Island	-0.004	0.006	Not applicable	Not applicable
Entered through DEP	-0.012	<b>-0.030</b>	Not sig.	Not sig.
DEP 3 or more months	-0.010	<b>-0.046</b>	-0.025	<b>-0.055</b>
Felony or serious misdemeanor	0.004	<b>0.048</b>	Not sig.	<b>0.043</b>
Drugs	0.011	<b>0.047</b>	0.033	0.051
Dependents	0.038	0.050	0.066	Not sig.
Other	0.024	0.027	0.025	Not sig.
Meets retention weight/height	-0.025	-0.028	0.012	Not sig.
Recruited as senior	-0.015	-0.018	-0.022	-0.037
Entered in JJAS	-0.017	-0.016	-0.030	-0.023
Contract guarantee	-0.014	-0.014	-0.023	-0.031
5- or 6-year obligor	-0.018	<b>-0.047</b>	-0.024	Not sig.
AFQT Category IV	Not sig.	-0.031	Not sig.	Not sig.

## Appendix B: More on bootcamp separation codes

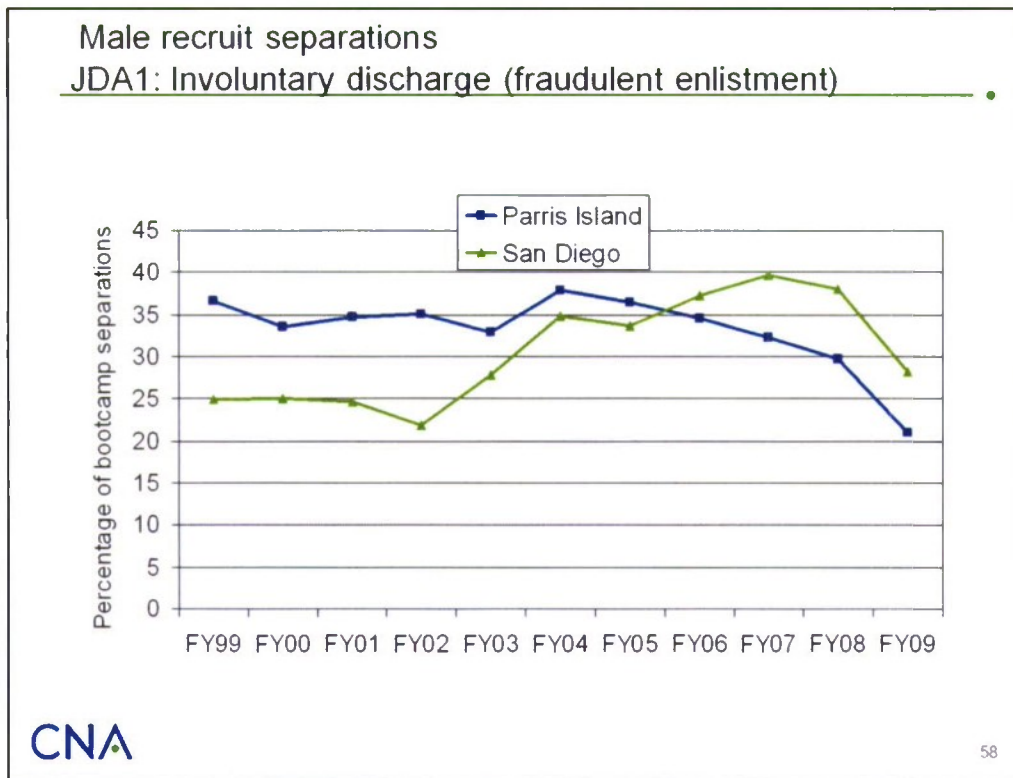


We repeatedly are asked to analyze separation codes and have done many such tabulations over the years. Our conclusion is that this is not a very revealing exercise. When a recruit fails at bootcamp, there are often multiple reasons: (a) he or she may not be trying very hard (entry-level conduct and performance), (b) he or she may have suffered an injury (a variety of separation codes apply), or (c) something in the recruit's record may have been discovered that indicates a fraudulent or erroneous enlistment (similarly, a variety of separation codes could apply). Since there is no hierarchy of codes (and only one code can be used), it is somewhat arbitrary as to what separation code is actually used.

In addition, once it is clear that the recruit will be separated, there is very little reason to pay attention to the exact reason for the separation. The MCRDs want to focus on the recruits who are in the process of becoming Marines.

In this appendix, we illustrate how some separation codes have been used in the past decade. We begin with a comparison of how particular codes have been used by the two depots for separating male recruits. The top ten separation reasons for female recruits are virtually identical to the separation reasons for male recruits.





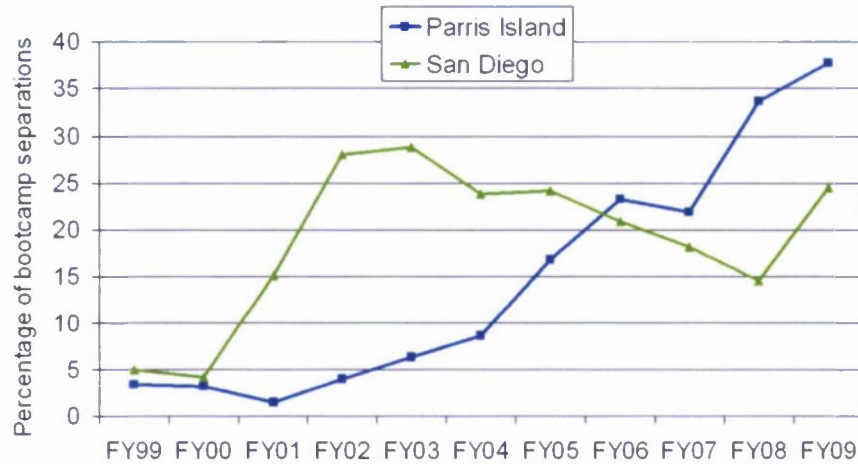
JDA1, involuntary discharge (fraudulent enlistment), has been the most popular separation code for male recruits at both bootcamps over the period. Although some Marine Corps fraudulent enlistment separation codes provide specific reasons, this separation code is general. Indeed, that may be why it is so popular.

About 25 percent of male separations at MCRD San Diego were given this code from FY99 to FY01. The percentage of separations with this code rose fairly steadily, peaking at 40 percent of separations for FY07 accessions. Since then, the percentage has fallen to just under 30 percent.

From FY99 through FY02, about 35 percent of male recruits separated from Parris Island were given the separation code JDA1. From the peak in FY04, the percentage of separations given this reason declined; in FY09, 20 percent of men separated from Parris Island were given this code.

## Male recruit separations

JFV1: Convenience of government, not a disability



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59

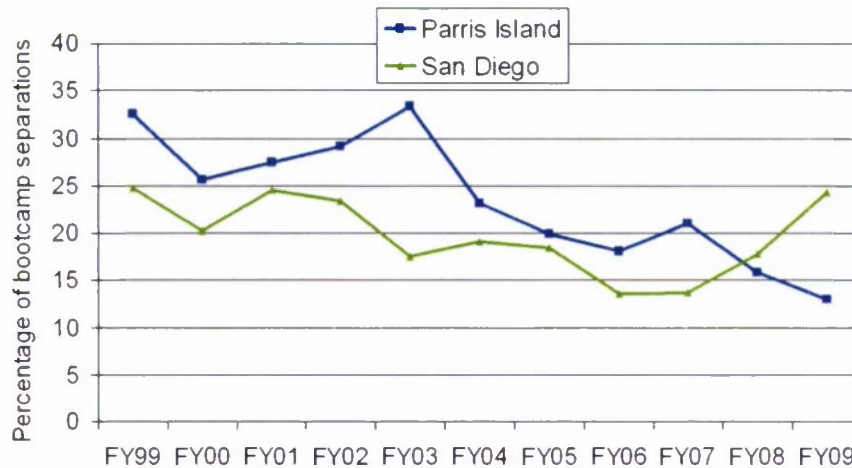
JFV1, convenience of the government, not a disability, was used for less than 5 percent of the male separations from either depot in FY99 and FY00. By FY02, almost 30 percent of the separations for MCRD San Diego were given this code.

MCRD Parris Island had a steady rise in the percentage of recruits separated with this code; in FY09, almost 38 percent of male separations were separated with JFV1.

This code doesn't really illustrate a change in *reason* for the separations because the code reason is quite vague. It probably just indicates that separation personnel found the code easy to use over the period.

## Male recruit separations

JGA1: Involuntary discharge (entry-level conduct and performance)



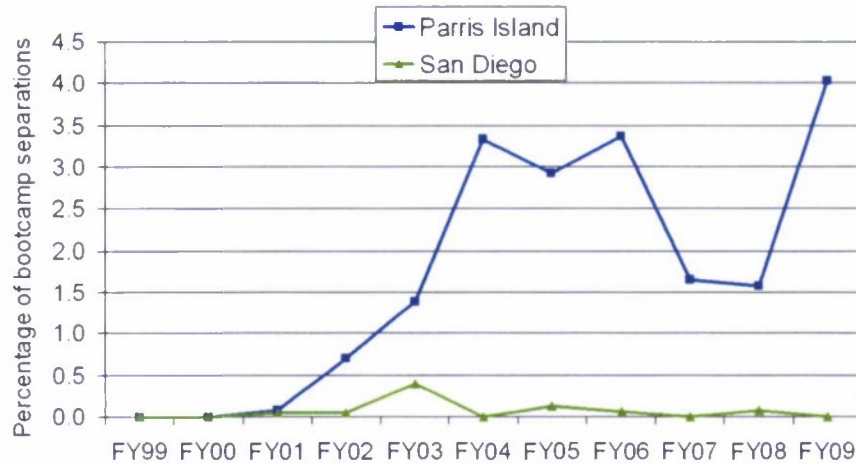
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60

JGA1, involuntary discharge (entry-level conduct and performance), was the second most popular code for male MCRD separations over the entire period. Here we see more consistent use by year across the two depots, although, in FY09, MCRD San Diego increased use and separated 25 percent of male recruits under this code, whereas MCRD Parris Island separated less than 15 percent.

## Male recruit separations

### JFX1: Involuntary discharge (personality disorder)



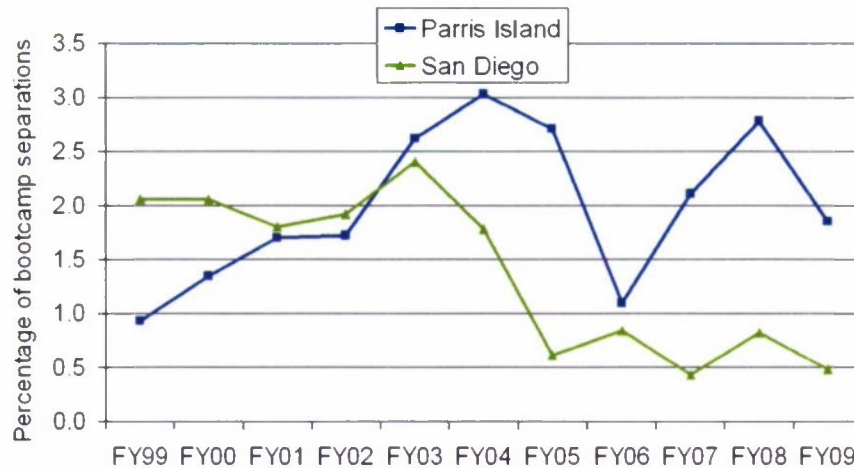
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61

JFX1, involuntary discharge (personality disorder), has been used primarily by Parris Island. In FY09, 4 percent of the separations there were for personality disorders. There is no reason to expect that personality disorders were more prevalent at Parris Island.



Male recruit separations  
JFL1: Physical disability with severance pay

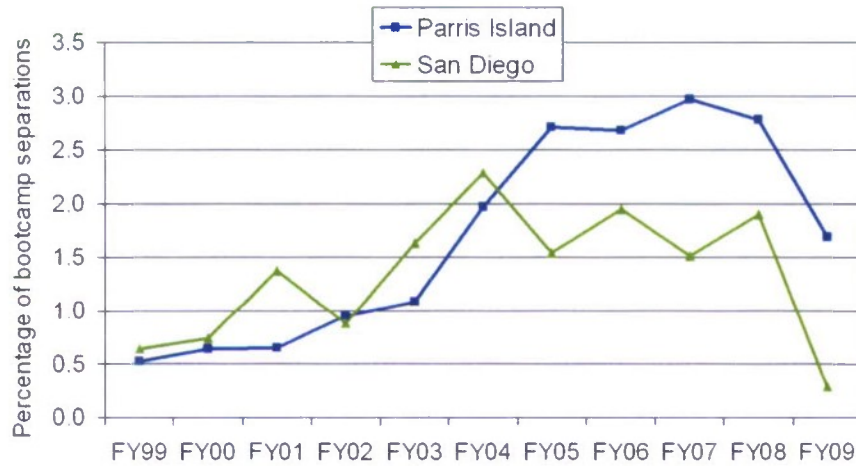


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62

JFL1, physical disability with severance pay, separations have been falling at MCRD San Diego but rising at MCRD Parris Island. In earlier years, there were fairly substantial numbers of physical disability separations from the depots, but these separations were without severance pay. Severance pay separations require that the recruit be in service for at least 6 months. Thus, these separations are clearly recruits who were at the depots longer than the normal training time of 12 weeks.

Male recruit separations  
SFK1: Separated to TDRL



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63

SFK1, separated to the temporary disabled retired list (TDRL), separations increased at both depots (although more sharply at Parris Island) for most of the period and have since decreased. Recruits with more serious injuries are separated to the TDRL. Their cases are reevaluated after some period of time.

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